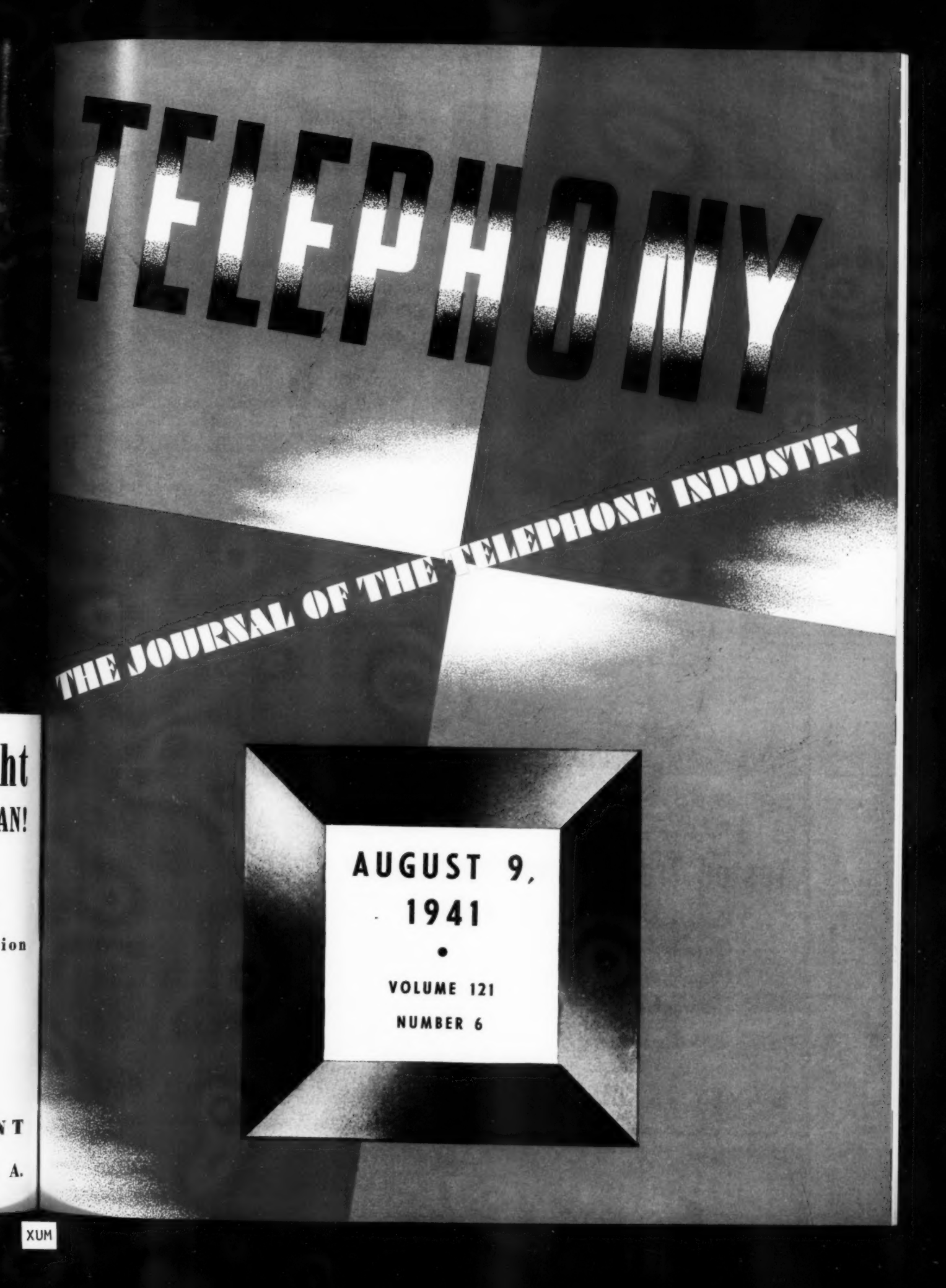
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THE JOURNAL OF THE TELEPHONE INDUSTRY
AUGUST 9, 1941
VOLUME 121
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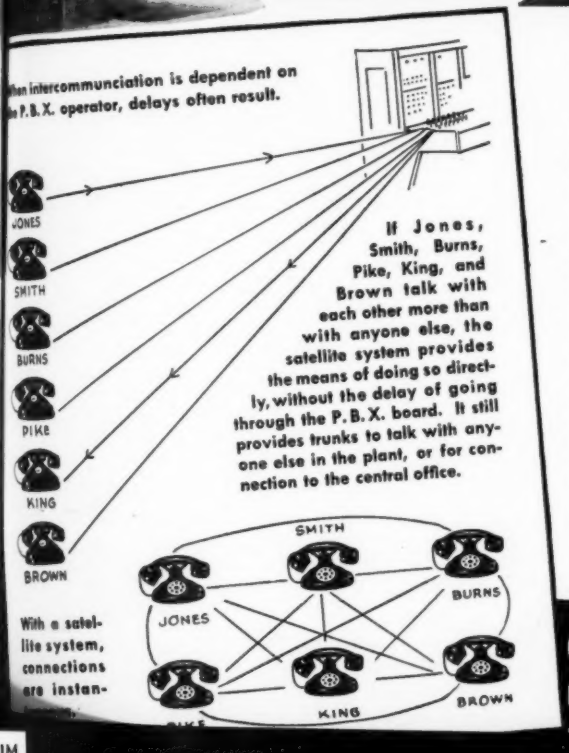
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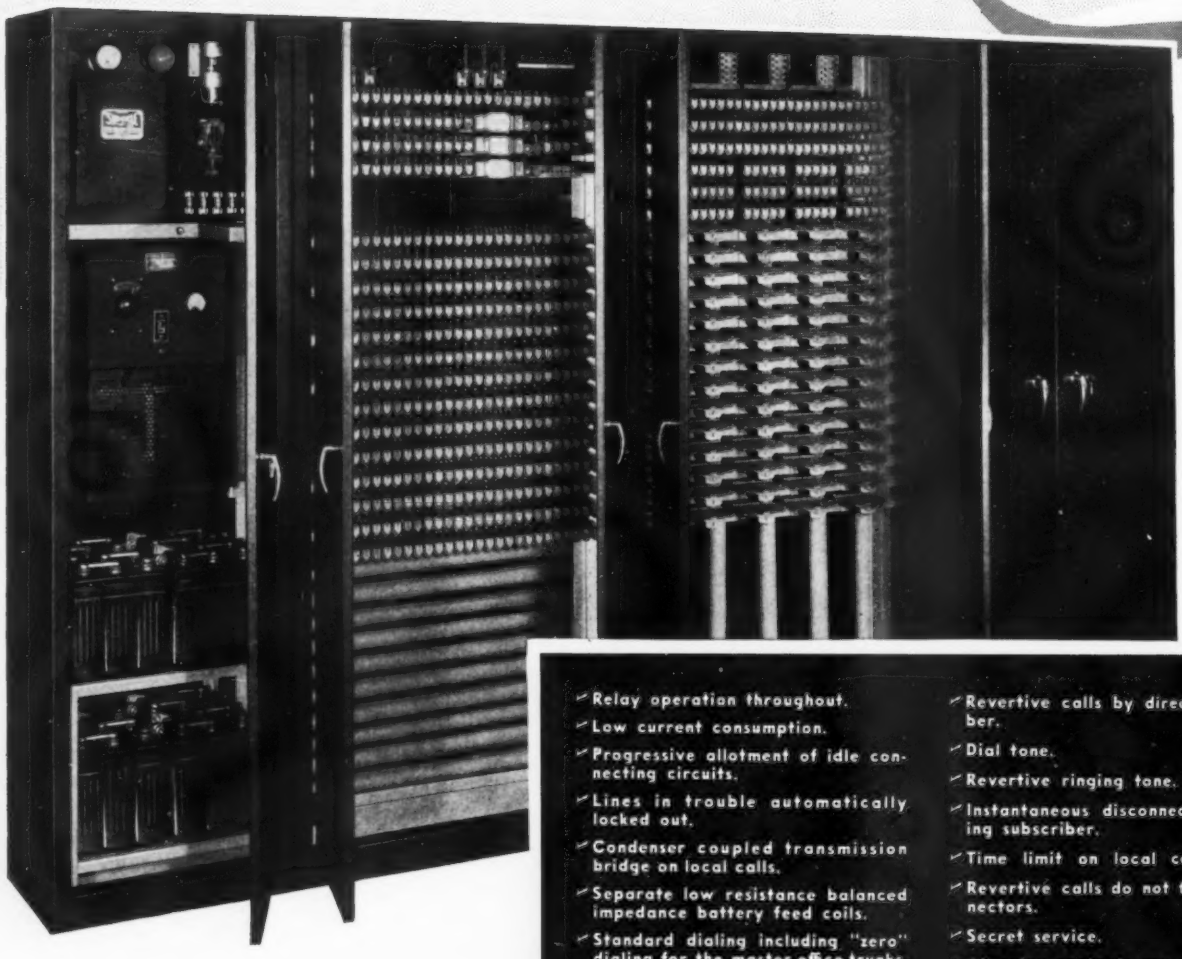

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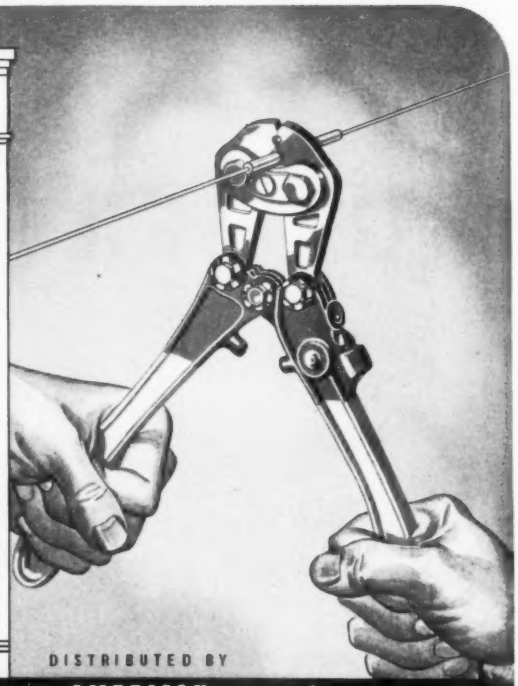

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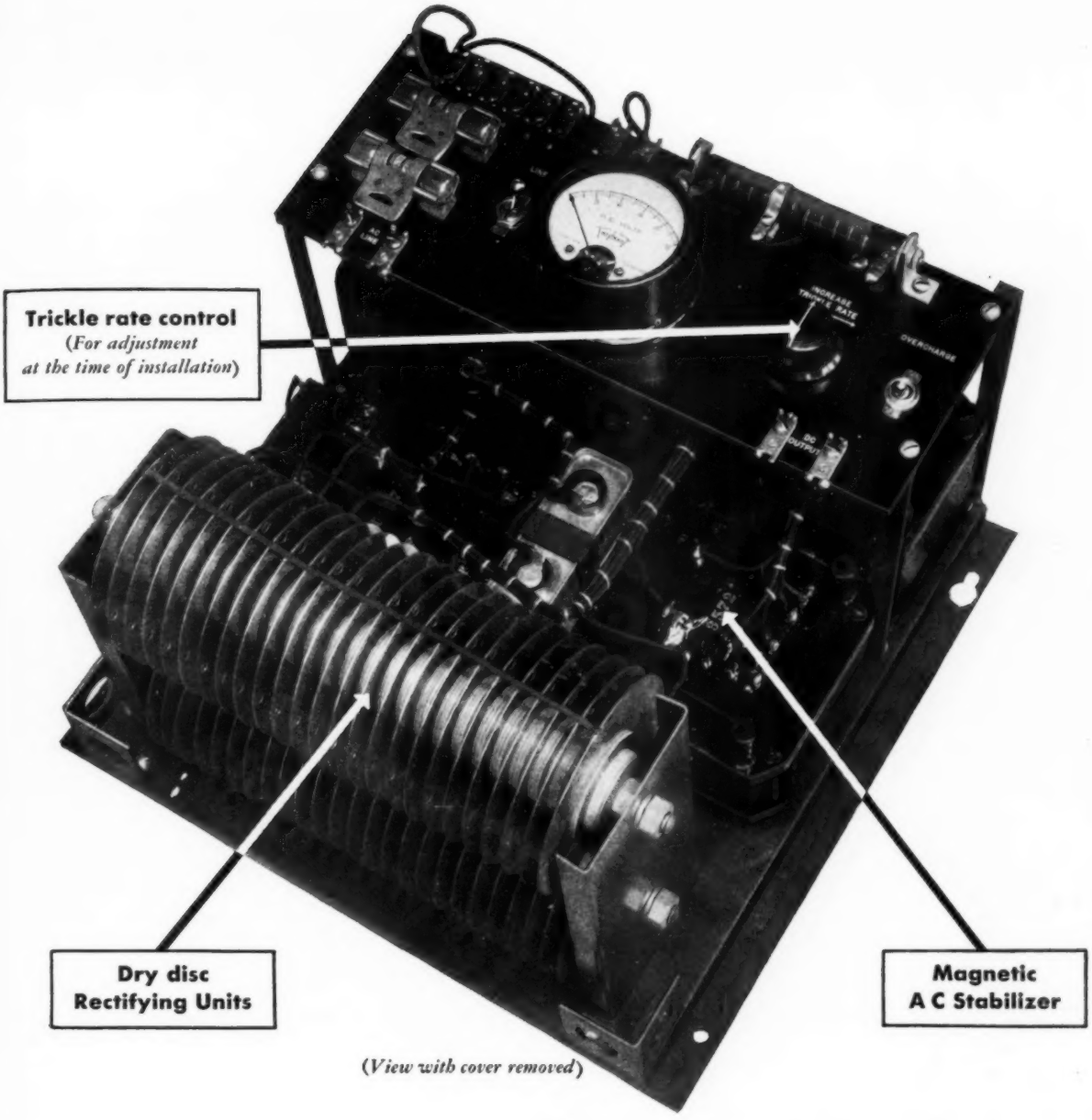

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The Journal of the Telephone Industry

August 9, 1941 — Vol. 121, No. 6

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VARISTORS and THERMISTORS
In Telephony

By ARTHUR L. ALBERT
Professor of Communication Engineering,
Oregon State College

Two interesting circuit elements—one whose resistance varies with a change in applied potential, and the other whose resistance changes rapidly with a variation in temperature—are being utilized in telephone work.

WHEN a communication network (or in fact any electrical circuit) is analyzed, it is found to consist largely of resistors, inductors, and capacitors, or of devices having the fundamental properties of these units. Thus, there is some ground for saying that if a person knew all about resistance, inductance, capacitance, and their combinations, mastery of electrical theory would be his.

It is only natural that all of us have breathed a sigh of relief when we found that the circuit we have had to study contained only resistors. Of course, it was recognized that there was a little temperature variation in the resistance of these, but in most instances the resistance could be considered constant, at least for the usual values of current, voltage, and frequency used.

In retrospect, early telephone circuits were very simple. And then, along came the vacuum tube, which would do such unheard of things as amplify weakened speech waves, modulate carrier frequencies, and rectify alternating currents. Vacuum tubes produced revolutionary changes in circuits; their characteristics could readily be controlled, and hence they provided a controllable variable circuit element. Vacuum tubes were often regarded as special electronic devices, however, and strange things were actually expected from them as compared with resistors, inductors, and capacitors.

Early in the history of electricity, resistors were found to have queer characteristics, but little was done to make practical use of these phenomena. Thus in 1873 a telegraph worker named Smith observed that the resistance of selenium resistors varied when sunlight fell upon them. Of course, resistance variations with temperature changes were also noted, as previously mentioned, and with progress in the field the increase caused by skin effect in the effective resistance of a resistor became apparent.

But normally these are small effects and variations which are not readily controllable for practical circuit adaptations. A really revolutionary change in circuit design was ushered in by the commercial availability of the copper-oxide rectifier. (Jr. of A.I.E.E., March, 1927.)

ARTHUR L. ALBERT

Copper-Oxide Varistor

The first commercial use of this device was for rectification, and many applications were found for it. Copper-oxide rectifiers were used for such purposes as battery charging, and very small ones were placed inside instrument cases and so connected that the ordinary direct-current instrument could be used to measure alternating-current values (Proc. I.R.E., February, 1931). This made possible the inexpensive yet reliable copper-oxide instruments available today.

The copper-oxide rectifier is made by forming what is, in reality, a layer of cuprous oxide on a copper disk. An intimate contact layer, therefore, exists between the oxide and the "mother" copper, and it is

this boundary layer which gives the device its characteristics. A metallic surface is placed in contact with the outer oxide surface, merely to act as a current-gathering electrode.

As the typical characteristic curves of *Fig. 1* indicate, when the oxide is negative and the copper is positive, the resistance to current flow is very high, and when the oxide is positive and the copper is negative, the resistance is very low, falling to only about four ohms. Of course, these values depend on the particular unit and the purpose it is designed to serve.

As is evident from *Fig. 1*, the copper-oxide rectifier unit can be made to have almost any resistance, depending on the sign and the magnitude of the voltage impressed across it. Thus, the copper-oxide rectifier is in reality a variable circuit element, and a controllable variable element at that.

To be specific, if this device is used in a circuit and the oxide is made about 1.5 volts negative, then the element of *Fig. 1* will offer a resistance of about 20,000 ohms to a small alternating-current value impressed across it. Furthermore, if the oxide is made less negative, the resistance it presents will decrease somewhat, and if the oxide is made positive it will act as a circuit element of a few ohms. It is now quite apparent why the word copper-oxide *varistor* was coined.

Non-Symmetrical and Symmetrical Varistors

As is shown by *Fig. 1*, the copper-oxide varistor and devices having similar characteristics are non-symmetrical in their operation. That is, if several volts of alternating potential are impressed across one of these, a large current will flow for the half cycle that the oxide is positive, and a very small current which is often negligible will flow for the half cycle that it is negative. It is this non-symmetrical feature which makes possible the use of the copper-oxide unit as a rectifier.

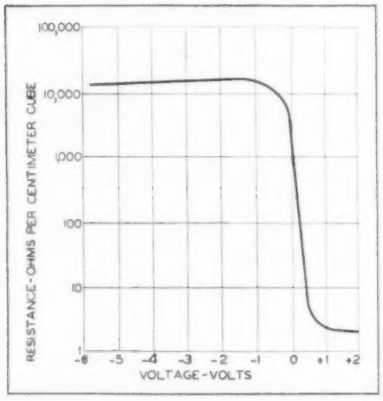
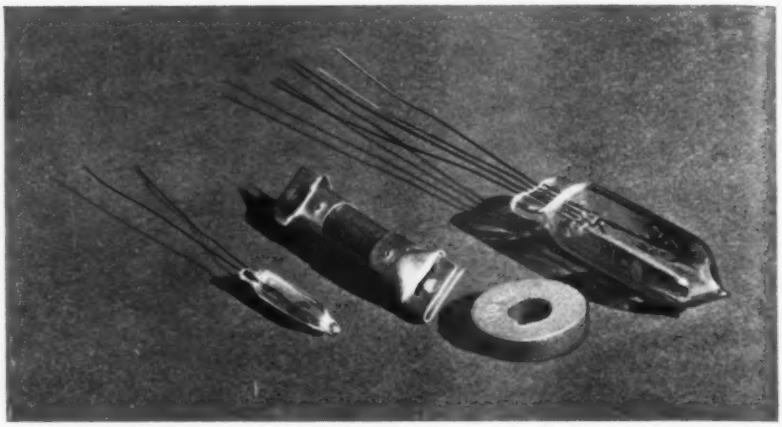


Fig. 1. Characteristics of a typical copper-oxide varistor. Negative voltage indicates oxide negative with respect to copper. Positive voltage indicates oxide positive with respect to copper. At two volts positive the resistance is about four ohms.



Thermistors are circuit elements whose resistances vary rapidly with a change in temperature. They are made from materials known as "semi-conductors," and have a large negative temperature coefficient of resistance. (Photo, courtesy Bell Telephone Laboratories.)

Symmetrical varistors are also available, one of these being "thyrite." This consists of a large number of silicon carbide granules bonded together by a ceramic material. Characteristic curves for thyrite and copper-oxide varistors are shown in *Fig. 2*. As previously mentioned, the variable-resistance characteristics of thyrite are symmetrical about the zero voltage value, but those of copper-oxide decidedly are not.

Considering the word "varistor" to cover all types of controlled variable resistance elements, there is yet another class to be considered. These include the devices whose resistance changes in a pronounced manner with temperature variations; they are accordingly called thermistors. As will be shown later, they are of various types and characteristics. Thus, it is found that there are at least three types of varistors at present; these include the non-symmetrical varistors, the symmetrical varistors, and the thermistors.

Theory of Copper-Oxide Varistors

Copper-oxide devices have been introduced to TELEPHONY readers in previous issues (TELEPHONY, July 1, November 11, and December 9, 1939). Although their uses as rectifiers, modulators, and demodulators were those considered, little was said regarding their theory. This has been explained in a recent article by Brattain *(Bell Laboratories Record*, January, 1941), from which much of the following theory is summarized.

According to this article, a typical varistor consists of a layer of red cuprous oxide about 0.003-inch thick formed on one surface of a copper disk. Contact for one side of the circuit is readily made to the copper, but some special provisions must be made for contact with the oxide surface. In the early rectifiers, a washer of some soft material was clamped on the oxide surface to form an electrode. In varistors such as

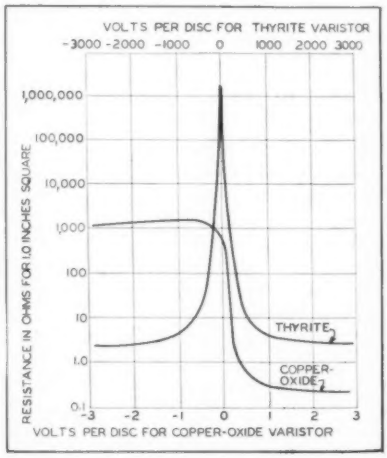


Fig. 2. Characteristic curves for copper oxide and silicon carbide or thyrite varistor disks. Note that the thyrite varistor is symmetrical and that it is a high voltage device. (Copper-oxide varistors of different characteristics are shown in Figs. 1 and 2.)

previously discussed, a metallic contact is vaporized on the oxide.

The phenomenon giving the varistor its characteristic is at the interface between the cuprous oxide and the copper. As was previously mentioned, this resistance is very high when the oxide is negative, and low when it is positive. This low-resistance value approaches as a lower limit that of the ohmic series resistance in the circuit. For cuprous oxide on copper, the resistance is largely in the oxide. This will vary widely from sample to sample, and depends on past history.

As was previously mentioned, some type of current-collecting electrode must be placed in contact with the outer oxide layer. Brattain states in his article that a vaporized metal contact, and a firmly-pressed tinned lead washer and colloidal graphite contact have proved most useful. In making the current-collecting metallic electrode for contact with the oxide, care must be taken to prevent secondary rectifying effects which would oppose the action of the main interface action. Brattain states that sprayed, sputtered, and some vaporized metal contacts produce these secondary effects and gives substantiating curves.

In this connection, statements have been made in print regarding the successful formation on the outer oxide surface of a metallic copper current-collecting electrode from the oxide material itself. This would give a device composed of copper-cuprous oxide-copper, and just how it would function if the two interfaces were equally effective in rectification is not apparent.

Leakage over the edges of the copper-oxide varistor is bothersome, reducing the high resistance when the oxide is negative from about 100,000 to 10,000 ohms for a particular specimen.

The equivalent circuit for a copper-oxide varistor at high frequencies is shown in *Fig. 3*. Of course, for direct potentials and for very low alternating frequencies, the varistor acts merely as a varying resistance device. In a sense, however, the oxide is a dielectric between two metal (current-collecting) electrodes and hence the varistor contains capacitance, the effect of which becomes evident at about 1,000 cycles.

The relation of this capacitance to the rest of the circuit appears to be quite complicated, although above 50 kilocycles it is effectively in parallel with the variable resistor as indicated. The resistances of the units have large negative temperature coefficients, but the capacitance is not affected appreciably. Other interesting characteristics are given by Brattain.

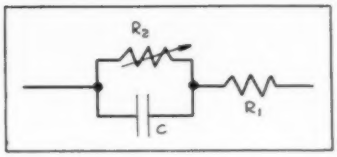


Fig. 3. Equivalent circuit for a copper-oxide rectifier when operated in the frequency range from 50,000 to 5,000,000 cycles. The value R_2 varies with the impressed voltage. (For these and other values, consult Bell Laboratories Record, January, 1941.)

Theory of Thyrite Varistor

The thyrite varistor is of the symmetrical type as contrasted with the non-symmetrical copper-oxide device just considered. This fact is illustrated by the characteristic curves shown in *Fig. 2*. For the thyrite varistor the resistance is very high for low voltages, and low for high voltages and is about the same regardless of the polarity of the voltage. Such relations do not hold for the copper oxide which has non-symmetrical characteristics.

As a further contrast, note that the thyrite device is a high-voltage unit, whereas the copper-oxide unit decidedly is not. Thus, the fields of application are somewhat different.

A comprehensive treatment of the thyrite varistor is given by Grisdale in the *Bell Laboratories Record* for October, 1940, from which the following is largely summarized. Silicon carbide is made in electric furnaces from which it comes in fairly large crystalline pieces. In making the silicon carbide or thyrite varistors, these pieces are crushed into small granules which are processed for size, etc., and then are embedded in a vitreous ceramic material which acts as a matrix.

It is explained in Grisdale's article that the peculiar resistance-voltage characteristic of the silicon carbide or thyrite resistor of *Fig. 2* is not caused by any unusual characteristics of the individual granules, but is due to the contact effects between them.

Thus, this varistor may be visualized as an aggregate of granules, each more or less in contact with the others adjacent to it. The path of current through the aggregate is, accordingly, a rather complicated series-parallel circuit. The resistance of the individual granules themselves is constant, but the contact resistances and the number of contacts will vary with the impressed voltage thus giving the controllable resistance or varistor characteristics. The many contact resistances make this varistor a high-voltage device as compared with the copper-oxide varistor which has only a single interface contact to determine its characteristics.

As would be expected of such a composite device, many factors affect its final characteristics. The exact chemical composition is important, and the heat treatment produces remarkable variations. The temperature of operation changes the characteristics; nevertheless, the silicon carbide varistor can withstand temperatures of 350 degrees Centigrade, and also very high voltage overloads.

Silicon carbide varistors are used for voltage surge protection, and may be used to supplement the action of open space or carbon block protectors. They are also used across

(Please turn to page 23)

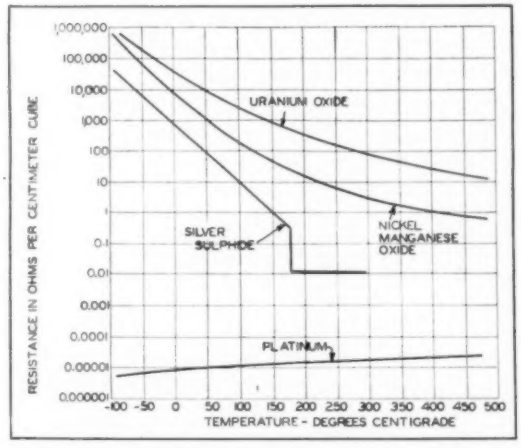
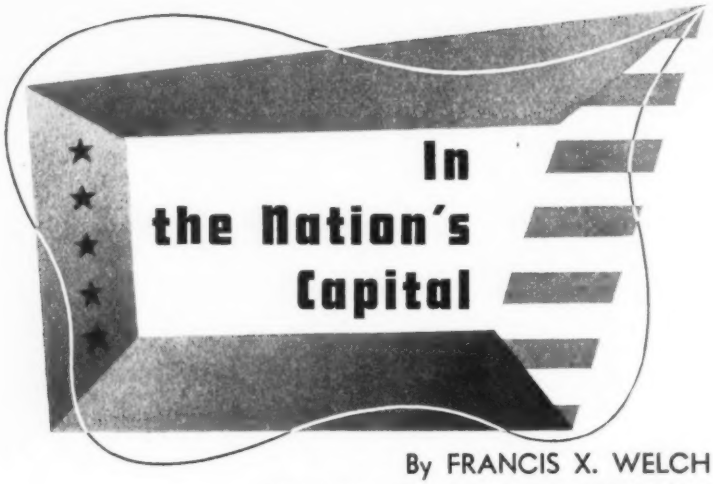


Fig. 4. Resistance-temperature curves for three semiconducting materials used for thermistors. The metal platinum is shown for comparison. The sudden change in the curve for silver sulphide is due to a change in the crystal structure. (See Bell Laboratories Record, December, 1940.)



By FRANCIS X. WELCH
Washington Correspondent for TELEPHONY

Senator White introduces bill to split up FCC into two divisions—one for radio broadcasting and one to handle telephone, telegraph and cable . . . New power case to test "prudent investment" valuation . . . REA allotted supplies of defense materials—none for new projects.

REGULAR readers of this department will not be surprised at Senator White's latest bill to regulate the FCC. The Maine Republican dropped this one into the hopper on the last day of July, with a broad hint that there won't be much action on it until the Senate Interstate Commerce Committee comes out of its huddle on a White resolution to investigate FCC-radio.

As far as the telephone industry is concerned, the White bill could be summed up in a single phrase as being essentially "a bill of divorcement." Senator White would split the FCC right in two, leaving Chairman Fly dangling somewhat precariously in the middle. Specifically, he would set up a "Division of Public Communications" (to take care of radio broadcasting) and a "Division of Private Communications" (to take care of telephone, telegraph, cable, and point-to-point commercial radio).

The new White bill would also distribute three commissioners each, to the two divisions. These three commissioners would be supreme in their own bailiwicks — meaning that any telephone question, for example, would be settled finally by the three commissioners of the "Division of Private Communications." It could not be appealed to the seven-man board as a whole.

Where does this leave the chairman? Truth to tell, it would seem to leave him as a short of figurehead or spare tire. The chairman, according to Senator White's description of his bill, would be "an executive officer and coordinator participating fully in all matters within the jurisdiction of the commission except the determination and decision of contested matters which are made the exclusive business of the divisions."

In other words, there are certain matters of general nature which cannot be definitely pigeonholed either into a division for radio broadcasting or into a division for commercial communications carriers. Such general matters would include the making of rules and regulations, the allocation of frequencies, the various radio services, qualification and licensing of operators, selection of personnel, etc. However, it is plain to see that the real, day-to-day regulatory work would be done by the two divisions of three commissioners each. And the chairman wouldn't have much to say about it.

Explaining his bill for divorcing radio from common carrier regulation under the FCC, Senator White had this to say about the chairman:

"Experience has amply demonstrated that the chairman cannot be expected to devote the time and attention necessary to the proper handling and disposition of these matters and also efficiently to discharge the many other duties which are unavoidably his under the act. As to these other duties, an attempt has also been made to clarify the status of the chairman and to make him—and him only—the official spokesman and representative of the commission in certain important respects."

Reading between the lines, this is so much soft soap. The FCC, in Senator White's opinion, has long suffered from over-domination by the chairman, and he is out to end that condition. Senator White's statement in the Senate on his proposed divorce proceedings continued:

"When the present (Communications) act was before the Congress in 1934 the bill passed by the Senate provided for a mandatory separation of the commission into divisions as is now proposed, but this plan was later abandoned and the present commission has been operating under a law which permitted but did not require it to organize itself into divisions. For the last two or three years the division plan has been entirely abandoned, and it seems certain that such abandonment has operated to the detriment of orderly procedure.

"We believe students of our legislation are thoroughly convinced of the wisdom of the mandatory division plan for at least two important reasons. They recognize that there are fundamental differences in the two classes of

communications above referred to; that rate making and public utility concepts are the very essence of private communications but have little, if any, application to communications with the public directly; that there has been a tendency upon the part of the commission to confuse the two and to apply the same concepts and philosophies in the regulation of the two. This must be avoided.

"In the second place, it is apparent that the subject of public or mass communications and the problem incident to the regulation thereof are so interesting and attractive that they draw public attention; that on the other hand there is very little of news value or opportunity for publicity in the regulation of common carriers, and that this had the result of centering the attention of the commission and its personnel almost exclusively on broadcasting and related problems and of preventing the giving of sufficient attention to equally important problems relating to private communications.

"The changes proposed in these two sections would bring about a much needed and desired separation of the judicial and legislative functions of the commission; would contribute to a sounder knowledge on the part of the commissioners of the communication problems committed to them; would make for orderly procedure and harmony of decision; and would speed up the disposition of cases before the commission and the divisions thereof."

The balance of Senator White's bill is given over to various proposals for amending the Communications Act with respect to radio regulation. Briefly, the White bill would:

(1) Liberalize appellate procedure and opportunities of parties to be heard before the FCC; (2) broaden the FCC's authority to approve the transfer of broadcasting facilities; (3) further regulate, equalize, and identify broadcasts dealing with political or controversial questions; (4) further protect station operators from liability in the performance of its "no censorship" duties under the original act; (5) definitely prohibit the FCC from interfering with the character of radio program material and of so-called "business phases" of the broadcasting industries; (6) miscellaneous clarifications of controversial sections of the present Communications Act.

* * *

It's much too early to determine whether there is, or will be, any real steam behind this bill introduced by Senator White. Ordinarily when a member of the political minority in Congress introduces a bill on an important subject, observers simply mark it down as just one of those things—perhaps a gesture for the folks back home or a forlorn hope by a would-be reformer.

However, Senator White stands in a different position, with respect to communications legislation, from the run-of-the-mill Republican in Congress. There are two reasons for this: (1) He is the acknowledged communications expert of the Senate membership and as such enjoys the respect, if not the active cooperation, of the chairman of the Interstate Commerce Committee, Senator Wheeler of Montana; (2) the Senate Interstate Commerce Committee is still deliberating on the White resolution to investigate the FCC and the radio industry; so that the introduction of this bill by Senator White at this time may possibly be a clue to the way the wind is blowing within the committee.

In any event, the introduction of the bill immediately started rumors that it was part of a plan to "get" Chairman Fly. Ever since he became so active in promoting the anti-network order against the chain broadcasters, a number of people in Washington, including some fairly regular New Dealers, have been looking over the tops of their eyeglasses, so to speak, at the energetic, young commission chairman.

This feeling has increased in some quarters since Chairman Fly took the lead in needling the press during the recent newspaper-radio control hearings. To put it bluntly, there are some irreverent souls in Washington who are beginning to suspect that Chairman Fly is developing into a rather unpredictable administrative quantity.

This is all gossip, of course. There were no definite or tangible developments during the past week in Washington indicating that the FCC, as presently constituted, will not weather the storm of Congressional criticism indefinitely. There are persistent reports that Chairman Fly may be "kicked upstairs"—presumably to some responsible post where his considerable legal and administrative talents will not be wasted. But this, too, is gossip.

At present, your correspondent can only report that the White bill is likely to stay in committee for quite a while before it gets definite action. As a rough and ready forecast, this writer advises you not to expect any FCC overhauling much before the snow flies—if then.

* * *

Well, the Federal Power Commission finally got off a decision last week which smacks the old traditional valuation landmark precedent of *Smyth v. Ames* (1898) right squarely between the two eyes. This, naturally, is of concern to telephone companies and any other form of regulated utility service; because the same valuation principles (if upheld by the Supreme Court) will undoubtedly be applied eventually to all.

Ever since the New Deal came to power in 1933, advocates of the "prudent investment" or other variations of original cost valuation have been out gunning for *Smyth v. Ames* and its children and grandchildren in case law.

As you are probably aware, the line of Supreme Court decisions which stems from *Smyth v. Ames*, generally insisted that the *present value* of utility properties (which in some cases was interpreted as "reproduction cost value") must be considered along with other factors (including original cost) before the regulatory commission could arrive at a valid determination of "fair value" of utility property for ratemaking purposes.

Since President Roosevelt began loading the Supreme Court with New Dealers, that tribunal has been edging away from this *Smyth v. Ames* rule. But, so far, no clean-cut test case has been presented to the court which would leave the Supreme Court no other alternative than to overrule *Smyth v. Ames* flatly—or affirm it.

Now the FPC has provided such a test case to all appearances. Doubtless it will be appealed. The case involved the fixing of wholesale rates charged by the Chicago District Electric Generating Corp. (situated in Indiana) for power sold to the Commonwealth Edison Co. of Chicago (sole owner of the generating company) and to the Northern Indiana Public Service Co.

(Please turn to page 24)

Pioneer Roster Goes To Press September 1

The 1941 roster of the Independent Pioneer Telephone Association will go to press September 1 and all new members received up to that date will be included in the roster, according to Secretary J. K. Johnston. Mr. Johnston states that new application blanks may be obtained by writing his office, 632 Lemcke Bldg., Indianapolis, Ind.

The association has had the largest growth this year of any previous year, with more than 600 new members.

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WE'RE NO BETTER THAN

John Doe Thinks

By W. C. PATTERSON
Assistant to President,
Michigan Bell Telephone Co.

Proper relations with the public can be maintained only if the telephone company renders the quality of service customers demand. The public determines whether any business shall live or die, Mr. Patterson declares.

THE TELEPHONE business will be operated with the present freedom *only if, and so long as, the public is willing that our companies shall have that freedom.* The public regulates every business in many ways. One of its regulations, particularly applicable to a competitive business, is the giving or withholding of its patronage to that business. But in both competitive and non-competitive businesses, it has a great number of other ways in which it exercises its control.

Laws relating to everything from incorporation to fair trade practices govern business. Public supervision is another rein in the public's hands. The mere expression of public opinion is in itself a form of public control. And, the public opinion of today may be the law of tomorrow. Truly, the public lays down the rules under which business operates—and, truly, *business continues to function only with public permission.*

What the public thinks, then, determines *how* a business may be conducted, whether it shall have more or less freedom—yes, it even determines whether that business shall live or die. The power of public judgment makes the very existence of a business dependent on an understanding of the basic or underlying currents of public attitude.

A fundamental of human attitude is that most people dislike too much power in others. They fear and distrust monopoly, for monopoly appears powerful. Monopolistic business prevents a person from exercising his own power of choice as to where he will buy. And when a person's power of choice is limited in that way, he immediately interprets that limitation on him as "prima facie" evidence that monopoly is powerful.

Now let us remember that the telephone business in a particular area can be operated in the public interest *only* as a monopoly. Therefore, there is a natural force, a fundamental of human attitude, operating in the direction of suspicion, distrust and dislike of the telephone companies, because they generally are monopolies and hence appear powerful.

Our telephone business, as a non-competitive and directly regulated industry, is more affected by and dependent on public attitude than nearly any other business in the world. The public would not long permit the rendering of a service it disliked, nor would it sanction charges for that service which it thought permitted inefficient operation. To a greater extent than nearly any other business, we operate our telephone business in the present manner because of public permission, generated by public favor.

While the business world can point with pride to many organizations that have paid serious attention to the importance of the public's likes and dislikes and consequently have established enviable successes, the path of business history is strewn with the wreckage of those that were oblivious to customer desires or unscientific in their analysis of those desires.

The art of adapting a business to the all-important pattern of public attitude has come to be known as public relations.

In the past decade or so business has become increasingly aware of a growing critical attitude on the part of the public. Some business men have been shocked to witness the translation of that attitude into terms of definite political repression.

Those business men who were badly shocked possibly had succeeded unconsciously in insulating themselves within their own immediate sphere. They had depended too completely on legalistic counsel in mak-

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ing their decisions—even though the legal profession is based primarily on the maintenance of the "status quo."

Consideration of only the legal questions involved in a problem certainly overlooks the fact that frequently you can win a case in the court of law and lose that case in the court of public opinion. It forgets that legal quibbling is distasteful to the public at large.

Only as the increasing critical attitude towards business made itself felt, only as a growing participation in the democratic process of balloting made greater masses of the people articulate, only then did business generally realize the importance of placing a greater reliance on the scientific appraisal of political, economic, social, and psychological factors. So, during the past few decades a new approach to business management has been slowly evolving, and now public relations has blossomed forth as a recognized tool of operations.

A prominent business executive has aptly defined public relations as "*finding out what the public likes and doing more of it and finding out what the public dislikes and doing less of it.*" I emphasize the words "finding out" in that definition. I'm sure the author of the statement most carefully and particularly included those words.

Nearly every business has tried to do what the public liked and to avoid doing what the public didn't like. But their "trying" consisted of doing what management thought was liked. In other words, business has come merrily along its way doing what it thought was right, without attempting scientifically to lift the curtain that conceals public attitude.

Although business has spent millions for research on technical and manufacturing problems, only cents have gone for scientific studies of public opinion. And even in those cases in which public attitude was studied and discovery was made of facts concerning opinion, little attempt was made to keep track of changes that might occur in that opinion. That was particularly unfortunate in view of the whimsical nature of public opinion. All of the public never seems to think alike at any one time and it never seems to think alike twice.

Apparently, the two most important factors influencing public relations are the quality of service and the cost of that service. And without a doubt, first in importance is quality. The kind of service rendered is the foundation upon which a good public relations structure rests. All of the public relations work that an organization can muster, or all of the advertising effort in the world, can't make people think that a poor job is a good one.

The real question with respect to service isn't what the paper records of our own organization indicate. The real question is whether the people using the service think that it is good. It doesn't help a customer a bit to tell him that 99 per cent of the listings in the directory are correct if *his* listing is wrong.

And now what about costs? If you ask a man whether he is getting his money's worth out of the service, he is almost bound to answer "yes." Even if the cost were 10 times what he is being charged, he might very well answer "yes" when he considers what the telephone does for him and what it would cost to secure a very poor substitute.

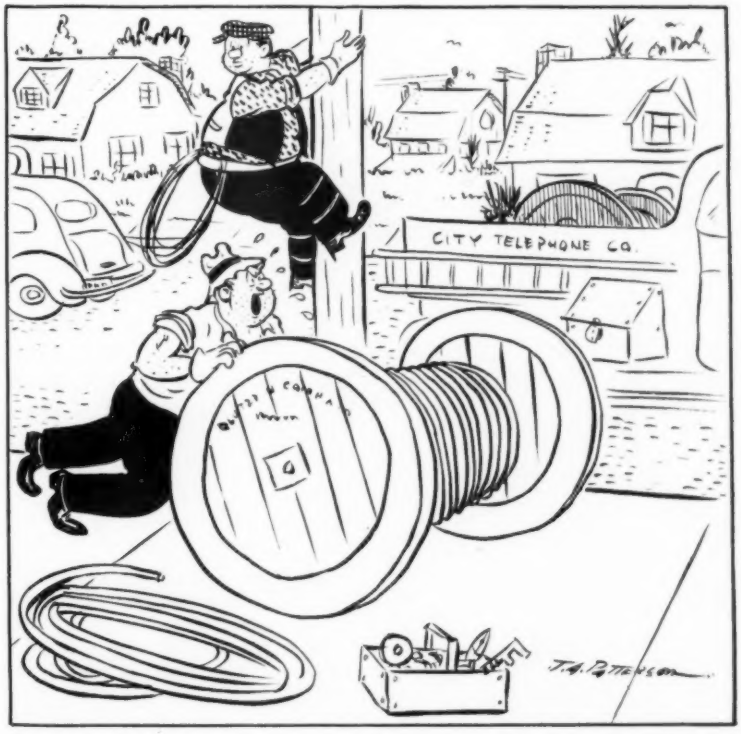
But if you change your question and ask him whether he is getting his service at as low a cost as he should, he isn't quite so sure that he is. How does he know what the telephone should cost him? There is no relative measure that he can use in determining the propriety of a certain rate. There is no other telephone service available, the price of which he can compare with the price he pays. That puts him in a lot different situation than he is in relative to almost any other purchase he makes. What is there, then, that the telephone company might do to help John Doe, the average customer, to arrive at a satisfactory answer to that question?

First, let's consider outward appearances and their effect on the public's reasoning. If I ride down the highway and see a telephone crew on the job, and there are two men actually working and two other men standing watching those two men work, I get the impression that there is some money being wasted on the job.

If I walk into a business office and see a lot of ornate furniture and extravagant appearing decorations, I say to myself, "they do things in an expensive way!" Or if when in a business office, I see employes who do not appear busy, or supervisors standing and watching employes work, I decide that that company is inefficient.

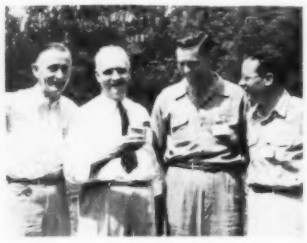
In other words, there are many things that a telephone company might do to create a negative im-

(Please turn to page 21)



"Then I says, 'If ya' think I'm gonna' push you around a dance floor half th' night, yer nuts.'"

Mid-West States Company Holds Picnic



"All fun and no business" was the order of the day at the annual picnic held for the employes of the Mid-West States Telephone Co. and their guests recently at Golden Lake Park near Oconomowoc, Wis., and the above snapshots show that everyone carried out the order. (1) This view shows the popular Jesters: MR. and MRS. LON J. of Rockford (extreme left and right) with MR. and MRS. HAROLD of Des Moines, Iowa (in the center). (2) It was "everybody for himself" when the dinner bell rang. (3) Beer, "cokes" and pop helped subdue the terrific heat—the beverage bar was very popular as this photo indicates. (4) ELEANOR KRAKOW, Rockford, (left), picnic chairman, was about the busiest person present and this "snap" shows her supervising STAN SHERMAN of Chicago and A. J. SUKAWATZ of Campbellsport while they carve the meat. (5) MARY DORAN of Rockford registers MARTY BELLION, Chicago, (Marty has cup in left hand and was never without it). (6) PETE WINEMILLER insisted on his picture being taken before he went out to umpire the baseball game as he was doubtful if he would survive after his usual terrible job of arbitration; with him are MRS. HAROLD JESTER (left) and MRS. LON JESTER. (7) A round-robin toast to the Jesters was drunk by FRANK ELDRIDGE, HARRY LANKFORD, ART RENN and PETE RENO, all of Chicago. (*Photographs by* NELS STOCKER, *Kearney's popular sales representative.*)

MORE than 200 employes of the Illinois and Wisconsin division of the Mid-West States Telephone Co. and their guests gathered at Golden Lake Park, near Oconomowoc, Wis., July 26 for that company's all-day picnic and outing, which is sponsored every year by Lon J. Jester, vice president and general manager.

A few years ago, Mr. Jester, at the request of his employes, arranged the first picnic and each year since then has seen a growing attendance—this year topping that of all previous picnics. Lon's annual outing has become a tradition in the Middle West, and his employes and those of neighboring operating companies as well as members of manufacturing firms look forward to the gay affair.

A steady stream of registrants started arriving early in the morning and during the hours preceding the luncheon they renewed old acquaintances, cooled off in beautiful Golden Lake and participated in various games.

By lunch time everyone had whetted his appetite sufficiently to do his bit in making a "big hole" in the long table of food, which at first appeared to be enough to feed a full army division.

In the afternoon the traditional annual seven-inning baseball game between the plant men of the Mid-West company and the so-called "peddlers" was played resulting in another victory for Lon's men by a score of 11 to 8.

Trying to get the "last drop from the cup" at the Mid-West company's picnic are VERNE CLARK of Pekin, Ill.; MARTY BELLION, PETE WINEMILLER, DICK FAULHABER, JOHN RIES, FRANK ELDRIDGE, all of Chicago, and ART KRUEGER of Random Lake, Wis.

The peddlers were leading at the first of the sixth inning 6 to 5 but the defense as well as the batting attack of the salesmen crumbled in the last inning and the plant men scored at will. This makes the series stand four for the plant men and two for the "peddlers."

This year inaugurated the presentation of a loving cup on which the name of the winner of the baseball game will be inscribed each year.

Following the ball game, prizes presented by the "peddlers" were distributed.

Eleanor Krakow, of Rockford, was the chairman of the picnic committee and she is to be highly commended for the efficient manner in which she

(Please turn to page 34)

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The Cook XB is available in 11, 16 and 26 pair sizes and in the specially designed 6 pair size which is proving so popular in so many applications.

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Compound filling accomplished by an exclusive process that insures against shorts and grounds by permanently positioning the cable pairs.

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Heavy reversible zinc hood that permits mounting with stub from either top or bottom. Furnished either with or without cable stub.

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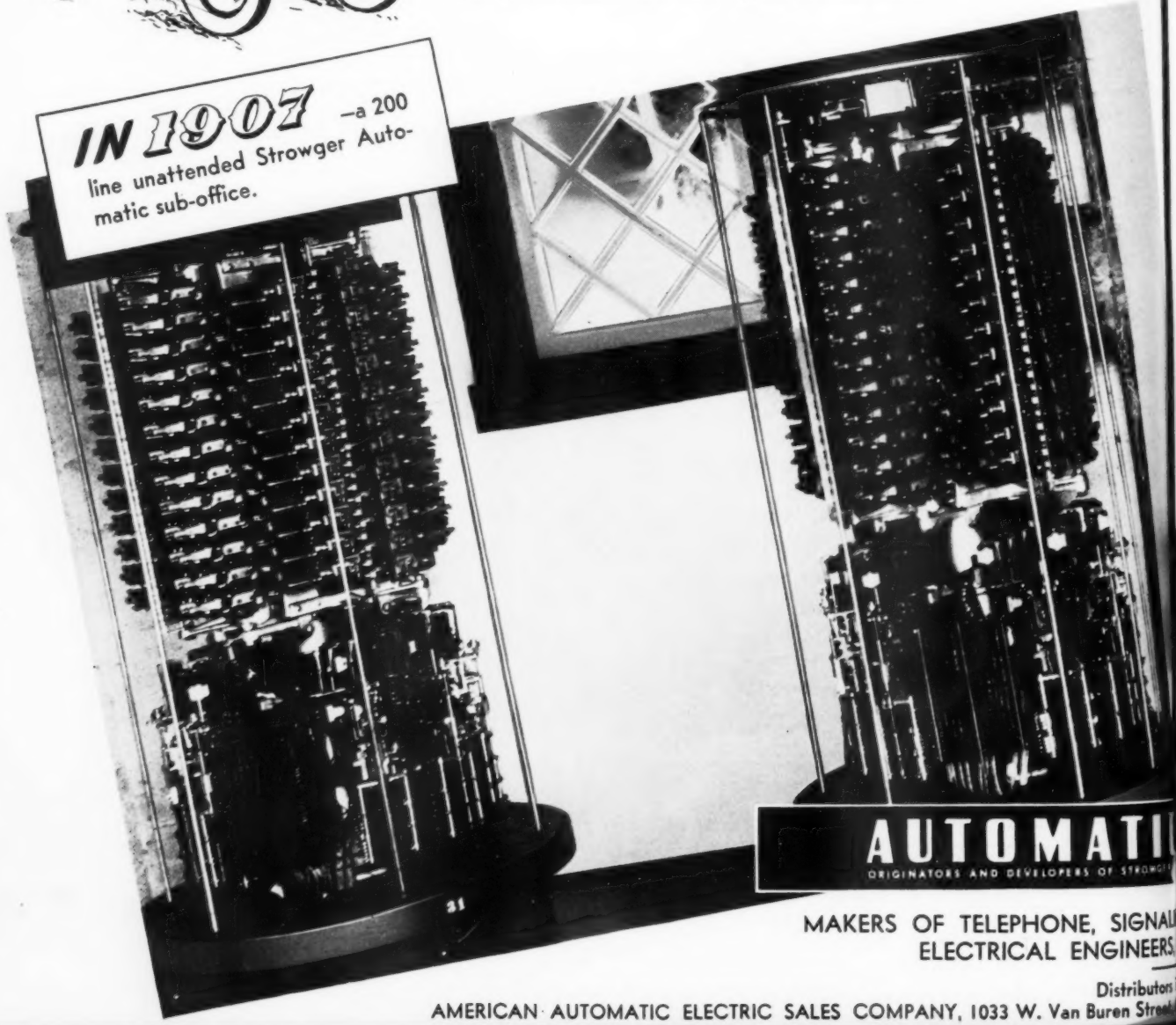
In many cases these requirements are best met by the unattende automatic switchboard. For such situations, Automatic Electric offer a wide range of standard automatic units in sizes and types to fit ever variety of local conditions.

To purchasers of such equipment Automatic Electric offers the advantages which come from over thirty years of experience in the design, manufacture and operation of unat-

IN 1907 —a 200 line unattended Strowger Automatic sub-office.



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tended automatic exchanges under every combination of conditions.

As far back as 1907, for example, Automatic Electric designed and installed unattended automatic units for use as sub-offices in city areas. As with today's rural automatic exchanges, these sub-offices were required to operate without attention—often for considerable periods of time.

The lessons learned in these early days are reflected in the dependability of service, long life, and low operating cost which are characteristic of the unattended automatic units being supplied today by Automatic Electric for installation in rural areas.

Why not let our representative study your small exchange requirements and make recommendations for your consideration?

IN 1941 —a 200 line unattended Strowger Automatic rural exchange.

ELECTRIC

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By RAY BLAIN
Technical Editor

THE WRITER had a long talk recently with a telephone substation installer who was disgruntled because he had submitted numerous suggested improvements to his company which were not even acknowledged. We don't believe that any company can afford not to consider suggestions of their men if they hope to prosper. Certainly they should be commended for their interest.

The man out on the job can detect defects in tools, material and methods, and suggest corrections long before they come to the attention of those in the office. Suggestions should be encouraged, and while it is true that all cannot be accepted, they should at least be acknowledged if only with a simple form letter.

Some new ideas certainly merit consideration though there may be reasons why certain ones cannot be used by a particular telephone company. This can all be explained to the men making the suggestions in such a manner that they will continue to submit their ideas, will not become disgruntled, and will work at all times for the best interest of their company.

* * *

Keeping accurate and complete plant records costs very little, and they are often the means of saving both time and money. A certain central office burned to the ground recently and with it went all plant records. A new switchboard was rushed in and installed in a short time, but the restoration of service was delayed considerably due to the fact that the cable records had all been destroyed so that tests had to be made and a new record compiled before splicers could cut in the new main frame.

If the manager of this exchange had maintained a map of the cable system showing the exchange and kept a copy in his home or some location other than the exchange, both time and money could have been saved. This is a small thing, easy to do, and as the modern saying goes, "It is always best to lock the garage before the car is stolen."

* * *

A cable splicer left his trailer in the street in front of my house the other night guarded by two red lanterns of the old-fashioned variety. The next morning the globe of one lantern was broken and the other was out—no doubt the work of a mischievous youth. It would appear that some manufacturer would develop a flasher type rugged warning signal of the compressed gas type for use on all trucks and trailers which must be left on the job overnight. These lights could be either built in the vehicle or attached by a locking bracket.

* * *

It is surprising that so few telephone companies use white friction tape. This tape may be obtained from any of the regular telephone supply houses at a reasonable cost and certainly presents a much better appearance than the black variety when used to splice wire tacked on a light background.

* * *

EZRA STEVENS of the Raytheon Manufacturing Co. stopped off in Washington between planes on a recent trip around the country on his quest of raw materials necessary to fill rush orders.

* * *

I have just received word that my old friend, **C. M. BRENTLINGER,** of Montclair, N. J., chief of staff of **E. R. SHUTE,** vice president in charge of traffic of the Western Union Telegraph Co., has been promoted to the position of division traffic superintendent, of the Lake Division, largest traffic unit in the telegraph network, with headquarters at Chicago.

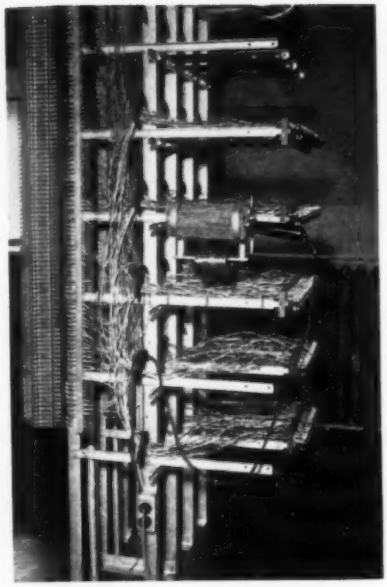
* * *

It is often amusing to note the pocket tools carried by the average telephone installer. These tools are often so numerous that the man spends more time selecting the tool and removing from the pack than in actually using it in his work. While it is true that proper tools are necessary, it is believed that their number should be reduced to an absolute minimum. The best golf is seldom played by a man with an overloaded bag of special clubs, but rather one equipped with a minimum number and who knows how to make use of each to best advantage.

SOLDERING IRON HOLDER: During the inspection of a new central office installation recently, one member of our party was seriously burned on the hand by coming into accidental contact with an unguarded hot soldering iron. An unguarded soldering iron presents a danger not only to workmen; fires may be caused by a heated iron coming into contact with inflammable material.

This danger may be easily avoided, for it is simple to provide a safe holder for a soldering iron to be mounted on the main frame. The accompanying photograph indicates how such a holder may be easily fabricated locally from heavy screen wire. Further refinements consists of a bracket to hold a spool of rosin core solder and a pair of heat coil pliers.

An outlet installed on the main frame for the connection of the power supply for heating the soldering iron also



Holder for soldering iron mounted on main frame. Note outlet for power supply for heating the iron.

proves highly desirable. Soldering iron holders, either with or without thermostatic control, can be purchased at small cost. These holders are of the portable type although they may also be permanently installed on or near the main frame if desired.

No Better Than John Doe Thinks

(Concluded from page 15)

pression with respect to cost of service. The avoidance of creating negative impressions is fundamental to good public relations.

Only occasionally does the opportunity present itself to point to a lowering of rates—but when that occasion occurs, even though the reduction affects only a limited number of people such as in a base rate area extension, paid publicity telling of that reduction will help public opinion.

The only other method that is available to convince people of the sincerity of the telephone business in its efforts to give low cost service is to tell the story of those things that we do to make for more efficient or economical operation and, of course, the most outstanding examples are those that may be attributed to the research of the telephone industry.

In telling our story to the public, there is one "don't" that should be written in large letters among the rules concerning public relations. People *don't* like other people who are too perfect. You don't like a person who never makes a mistake or poses as being too perfect.

Neither does the public like a company that sets itself up on a little pedestal and tries to appear to be sprouting wings. You like the individual who is human and makes mistakes. The public likes the same thing in a company. We can err in the telephone business and we do err. We should admit our frailties if we are to be liked by the public.

It is not my purpose to outline or discuss in detail the methods and tools that are used in carrying out the objectives of a public relations program. It is only my purpose to outline the general objectives of public relations.

We can all agree that the first tool in accomplishing those objectives is the rendition of good service. The second method is the giving of adequate information to the public. Sometimes we rely very largely on advertising or publicity. That method certainly has its place. But of far greater importance are employes who are able to and want to talk enthusiastically and intelligently about the things in which John Doe is interested.

We must remember that, for all practical purposes, "We're no better than John Doe *thinks*."

[EDITOR'S NOTE: *This article by Mr. Patterson was presented as an address before the recent Michigan convention.*]

▼ ▼

Invention Corrects Rural Power Outages

A revolutionary new device invented by two young REA engineers passed its final tests and went into full service at Bowling Green, Va., on March 21, according to the May issue of *Rural Electrification News*. The device, an automatic recording outage locator, provides a solution to the troublesome problem of long outages of rural power service. It is now in commercial production and soon will be available as approved equipment for REA-financed systems.

The equipment consists of a signal-sending mechanism on each section of line, and a receiver and recording instrument installed at some central point. Both are operated on high-frequency electric current, the so-called "carrier" current.

Normally, the sending mechanism does not operate. But when any section of the power line goes out of service, it starts operating, and this actuates the recorder. The recorder, located at headquarters, prints on a tape the time of the outage and the precise section on which it has occurred. When the trouble clears up, the time of restoration is also recorded on the tape. Each recorder will accommodate a large number of senders, and duplicate recorders may be located for greater convenience at two or more places.

Inasmuch as rural telephone lines are commonly the first casualty in storms which damage power lines . . . maintenance crews often do not learn of outages for hours, sometimes more than a day. Then they must patrol scores of miles in an effort to find the trouble.

The new equipment will save much of this patrol expense and obviate much of the revenue loss, it is said.

In addition to the automatic recording features, the research by which this equipment was developed has a rather unexpected by-product which may become even more valuable than the outage-reporting equipment.

The same current which operates the outage senders permits one-way communication between the headquarters and the maintenance crews in the field, and two-way communication appears possible, it is claimed. This result is made possible by use of the power lines as telephone circuits, with radio broadcasting effects on a portable receiver within a few rods of the electric lines.

▼ ▼

"Once in a Blue Moon"

Only once in five quadrillion times could this happen, according to mathematical experts: A woman injured in an accident in Milwaukee, Wis., telephoned her physician at Marquette 4442, then called her attorney at Marquette 4443, and next an insurance company physician at Marquette 4444. The three people called were at different locations.

▼ ▼

Dial System Installed

During the last few months, the Illinois Allied Telephone Co. has been occupied installing dial service in the Ohio, Ill., exchange. The new system was placed in operation July 1.

XUM

The Operator's Corner

By MAYME WORKMAN
Traffic Supervisor
The Illinois Telephone Association

"AM I GLAD to be back at work! I enjoyed my day off, but when the weather is hot our office is *so* comfortable it is really a pleasure to come to work!" This remark was overheard in the restroom of an air-conditioned central office as a young lady sank into a comfortable chair to relax for a few moments before going on duty.

Having worked in this exchange during the summer months, the writer can vouch for the operator's statement. At the present writing with the thermometer hovering around 100, the time spent in this air-conditioned office is a pleasant memory.

Some folks are opposed to air-conditioning because they fear it has an adverse effect upon their health due to the contrast in temperature, going from a warm to a much colder one and, vice versa. In questioning the chief operator, in the office under discussion, she stated they have fewer cases of absent time due to colds since the system was installed.

In supervising the work of the operators in the air-conditioned exchange, the writer was impressed with their pleasing tone and manner. The usual summer operating room symptoms were lacking: nervousness, occasional irritability, impatience, tired and listless voices, weary and distressed facial expressions. It was amazing to see operators leaving their positions at the end of the day looking as fresh as when they came to work in the morning.

All telephone companies are not financially able to install air-conditioning equipment but there are many other things that can be done to make the central office more comfortable during the summer months.

An operator working in a comfortable environment will perform better work than an operator who is handicapped by discomfort due to: straining her eyes because the lighting system is inadequate, faulty or improperly located; eyestrain caused by inability to control the natural light from windows and skylights; sitting on an uncomfortable chair; faulty or insufficient ventilating equipment, or lack of any such equipment; intense heat in operating rooms located directly under a roof that is not insulated; no cool drinking water provided. These are a few of the conditions that cause switchboard operators to dread the so-called "good old summertime."

In visiting an exchange recently, where the operating room is located on the second floor under the roof, the girls were standing at the switchboard because they found this position a little more comfortable. They explained when they sat next to the switchboard the perspiration trickled down their limbs causing them to be very uncomfortable.

Almost any operator will agree that sitting at a switchboard on a hot summer's day is just about the hottest place on earth.

Among the equipment available for central offices and, being used in some exchanges, resulting in increased efficiency and more pleasant working conditions for operators are:

Fluorescent Lighting — An economical, pure light which does not cast shadows on the switchboard; does not produce heat.

Venetian Blinds — Permit control of natural light; are durable and neat in appearance.

Health Chairs—Proper support at the operator's back, avoiding unnecessary fatigue.

Air-Conditioning Units—Installed in windows at small exchanges.

Insulation — Reduces temperature during summer months and heat loss in winter.

Electric Water Coolers or Fountains—Provide cool drinking water, constantly.

Electric Fans — Where air-conditioning is not practicable. Fans placed on the floor should have a shield to avoid accidents.

A Suggestion to Manufacturers

While there have been many excellent improvements in switchboard equipment, there is one suggestion, however, that manufacturers might consider which would contribute to the comfort of operators. Generally speaking, the lower part of an operator's position is made of solid wood. No chance for ventilation. That is why operators suffer discomfort during hot weather when seated at the switchboard. If this part of the board could be a sort of grill, a ventilating fan could be placed inside the switchboard during hot weather and the cool air could seep through. If some thought were given to this condition, no doubt a better and more practical solution to the problem would result.

At the present time, when traffic loads are unusually heavy in many exchanges, any effort toward keeping the switchboard operators comfortable will be worth while.

The management's interest and sympathetic understanding of the work and problems of the switchboard operator will go a long way toward keeping telephone service at a satisfactory level.

Question from Illinois Operators

1. On a messenger ticket should "P" or "M" be entered in the "Class" space?
2. Is there a chargeable report on "Room telephone DA?"
3. When is a "WH" report chargeable?
4. Is it necessary to enter the name of the calling party on all person-to-person calls?
5. Springfield is calling Peoria, Mr. Brown. She receives a report of "in city of Springfield c/o Leland Hotel." Should the Springfield operator tell her customer that Mr. Brown can be located at the Leland Hotel in Springfield, or should she say Mr. Brown is out of the city and not mention that he may be reached at the hotel?

The answers to these traffic questions are published on page 31.

▼ ▼

Varistors and Thermistors

(Continued from page 11)

electromagnets to reduce voltage surges when circuits are opened.

Thermistors

The word "thermistor," derived from the words "thermal resistor," is used to designate a new circuit element whose resistance varies greatly with temperature. Most metallic conductors used in telephony vary with temperature at least to a small extent. The resistance of a copper line wire increases with temperature increase, and copper is said to have a *positive* temperature coefficient. Thermistors are not metallic conductors, however, but are classed as semi-conductors, and have a *large negative* temperature coefficient.

The characteristics of three of the semi-conducting materials used for thermistors are shown in *Fig. 4*. As a comparison, the characteristics of the metal platinum with its positive coefficient are also shown. These characteristics are taken from an article on thermistors by Pearson in the *Bell Laboratories Record* for December, 1940. Note in particular the very wide range of resistance values made available merely by controlling the temperature. Thermistors are usually made in small current-carrying capacitors for telephone circuits, but may be designed to carry several amperes for special purposes.

Uses of Thermistors in Circuits

According to Pearson, there are three common ways of using thermistors in electric circuits to give a controlled variable resistance. In the first, the device is externally heated by the surrounding or ambient temperature. In the second method, the thermistor is directly heated by the controlling current flowing through the body of the thermistor. In the third method, the controlling or heating current passes through a separate heating coil in proximity to the varistor unit. Certain of the uses of thermistors will now be considered.

Because of its thermal capacity or heat storage, the variable resistance characteristic of the directly-heated thermistor can be used to delay the current rise in a circuit. Thus, if a directly-heated thermistor is placed in series with a device energized with direct-current, the initial resistance will be very high, and when the switch is first closed the current will be low. As the thermistor heats, however, its internal resistance will decrease, and thus the current will gradually increase to its final value. In this respect, the thermistor acts somewhat like an inductance or choke coil.

Since the resistance of a thermistor varies with the temperature, its application as a resistance thermometer is obvious. It is also apparent that a properly-designed thermistor can be placed in a circuit to offset the increase in resistance with temperature usually encountered in electric circuits. Also, because of the negative resistance characteristics, a thermistor can be made to oscillate in suitable circuits, particularly in the audio frequency range.

If a directly-heated thermistor is placed in series with the windings of an ordinary relay, the latter will be made slow acting. Thus, such a thermistor will prevent relay operation on voltage surges. An important application is found in the use of the indirectly-heated thermistor as a remotely controlled variable rheostat instead of the conventional sliding-contact type.

Varistors and thermistors are already of practical importance in electric circuits. Varistors, especially, have received wide applica-

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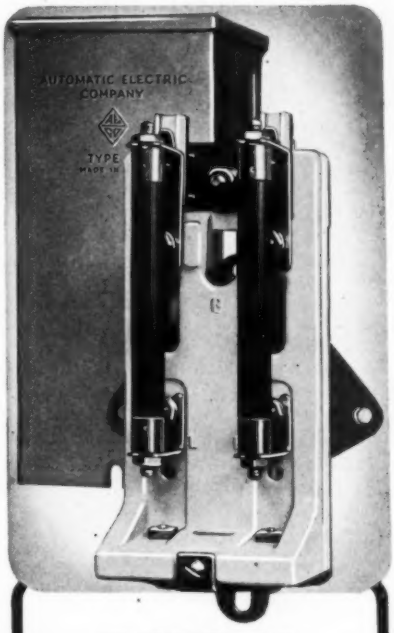

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XUM

tion, and their theory was made the subject of a paper by Bennett and Doba (*AIEE Transactions*, January, 1941). There is every reason to believe that with the advance of the profession, varistors and thermistors will be used in increasing numbers to do new "tricks," and to do old ones better.

In the Nation's Capital

(Concluded from page 13)

In short, the FPC went "all out" for the prudent investment theory (a variation of "original cost") as a basis for rate-making. Heretofore, the FPC had been nibbling at the idea in *re Interstate Power Co.*, 32 PUR (NS) 1 (1939), where rates were fixed entirely on original cost, in the absence of trustworthy evidence of reproduction cost.

In the Chicago case, however, the FPC absolutely refused to permit the introduction of *any evidence* bearing upon reproduction cost. This would seem to leave the appellate court no choice except: (1) to reverse the commission, because it has openly defied the *Smyth v. Ames* doctrine; or (2) avowedly repudiate the *Smyth v. Ames* doctrine itself.

Doubtless, the FCC and many of the state commissions will follow suit if the FPC's opinion in this case is upheld. The FPC opinion construes Section 208(a) of the Federal Power Act in a manner which will probably provoke bitter controversy. The section says:

"The commission may investigate and ascertain the actual legitimate cost of the property of every public utility, the depreciation therein, and, when found necessary for rate-making purposes, other facts which bear on the determination of such cost or depreciation, and the fair value of such property."

The commission contends that this confers full authority to use original cost, less depreciation, as the rate base, without bothering with such factors as reproduction cost and other matters heretofore considered by the Supreme Court as essential in determining fair value for rate-making purposes. Only when original cost cannot be ascertained will it be necessary to deal with such other items, according to the opinion.

* * *

From time to time some doubt has been expressed in this department as to the wisdom of allowing the REA program to keep going full blast in view of the increasing shortages of certain materials. Now OPACS has apparently got around to this viewpoint.

In an order issued on July 31 with the approval of OPM, the OPACS specified certain monthly supplies of material which REA will be allowed to use up to the end of January, 1942. The order specified 4,500 tons of copper; 3,100 tons of steel; 140 tons of zinc; 3½ tons of aluminum —all per month. These allocations will be further reduced by the amount of strategic materials required for direct defense work by REA and by such other savings as REA may be able to make through the use of substitute materials or methods.

The order contains the following significant paragraph:

"A further stipulation is that REA will use the foregoing material to complete work now in progress and will not undertake any new projects unless the allocated materials are sufficient to complete such projects."

* * *

There seems to be a steady exodus of key staff members to defense agencies. Joe Weiner, former utility director of SEC, is now Director of Civilian Supply. Smart young Julius Krug, who used to be FCC special investigator during the Bell investigation (later with TVA), is now OPM's expert on electric power and doing a swell job of it from early accounts.

Latest word is that Harry Booth, who went to the FCC early this year to organize a special telephone rates and research bureau, has gone to OPACS. Booth probably has not been too happy with the FCC ever since the Bell's last voluntary long-distance rate reduction order exploded right under his carefully-laid plans for a full-dress rate case against the Bell organization. Yet he has been working hard to set up the special bureau and get it running smoothly on all cylinders.

The telephone bureau will, of course, continue with its telephone rate studies. In a word, the outlook for the telephone business should hardly be prejudiced by this change.

California Pioneers Elect Executive Committee

At the recent convention of Chapter No. 1 of the Independent Pioneer Telephone Association, known as California Chapter, the election of an executive committee was deferred to be completed by mail in order that all members be given an opportunity to vote. The final results have now been tabulated and the following were elected for a period of one year:

E. H. Cheadle, Associated Telephone Co., Ltd., Santa Monica; Wm. DeCarteret, Exeter Telephone Co., Ltd., Exeter; Ernest Irwin, Associated Telephone Co., Ltd., Santa Monica and A. N. Johns, California Water & Telephone Co., San Francisco.

In addition to the four members above, the three elected officers will be ex-officio members of the committee. They are: President, C. F. Mason, Associated Telephone Co., Ltd.; vice president, A. Wardman, Consolidated Telephone Co., Whittier, and secretary-treasurer, George S. Blake, Associated Telephone Co., Ltd.

The above committee is now working on a program for the ensuing year and preparing the by-laws of the organization.

▼ ▼

Northwestern Bell Conducts Customer Survey

Approximately 10,000 subscribers to the service of the Northwestern Bell Telephone Co. in the five states in which it operates have been tagged for telephone interviews between now and the end of the year. The work is being done by carefully selected and specially trained groups of young women, whose job is to make customer attitude and service surveys. At each exchange they call a certain percentage of the subscribers, selected to give a cross section of the entire population served. Only representative exchanges, probably 40 in all, are to be visited for this purpose.

Commercial and traffic superintendents say that the survey is made with four purposes in mind: To secure the attitude of the customers toward the service generally; to determine specific service difficulties they are experiencing; to obtain their attitude toward the cost of telephone service in general, and to find out if any particular rates or charges are felt to be unreasonable. Supplementary questions are interposed where the customer is vague and indefinite in his replies, since specific information only is of value in the survey.

XUM

Standard Specifications For Poles Adopted

SIX TENTATIVE standards covering specifications for wood poles have just been formally adopted as American standards. These standards, of especial interest to the builders and operators of overhead electric, power and communication lines, were prepared under the sponsorship of the ASA Telephone Group which is made up of the Bell Telephone System and the United States Independent Telephone Association. They represent a consistent system of standards for the six major pole timbers of the United States—northern white cedar poles, western red cedar poles, chestnut poles, southern pine poles, lodgepole pine poles, and Douglas fir poles.

The wood pole standards have been in use for several years as tentative standards and have already been universally recognized as a satisfactory basis for the selection of poles. They establish practical limits that can be applied economically in the production of poles for general use, but they are also flexible enough to cover the purchase of poles of high quality for special purposes. These standards are so drawn as to give the maximum economy of the entire usable cut.

Included in the standard specifications are material requirements for shape and straightness of grain, limit defects such as knots, checks, insect damage and decay, and the minimum quality of acceptable poles is defined. Departures from straightness are held within practical limits for ordinary use. Decay and the presence of wood-rotting fungi are generally prohibited. Definite limitations are set, and fire-killed poles are acceptable only by special arrangement between producer and purchaser.

The standard dimensions now included with the specifications in one standard for each type of pole were based on recommended fiber stresses contained in the American standard for ultimate fiber stresses of wool poles. These standard dimensions have all been prepared according to the same principles for all types of poles. The sizes at six feet from the butt in all six standards have been so fixed with respect to ground-line resisting moments, that, for any given class and length of pole, all six species are equal in strength.

In calculating these six-feet-from-butt sizes, distance from the butt to the ground line for any given pole was assumed, by definition, to be as shown in the column in the tables headed "Ground Line Distance from Butt." The equality-in-strength principle holds good, however, for any reasonable depth of set required.

The committee responsible for these specifications is made up of representatives of 25 national organizations. Copies of the new edition of these standards may be ordered from the American Standards Association 29 W. 39th St., New York City at 20 cents a copy. They are listed below:

American Standard Specifications and Dimensions for
Northern White Cedar Poles—05.1-1941
Western Red Cedar Poles—05.2-1941
Chestnut Poles—05.3-1941
Southern Pine Poles—05.4-1941
Lodgepole Pine Poles—05.5-1941
Douglas Fir Poles—05.6-1941

Underground Cable Plant Nearly Completed

The Lucas County Telephone Co., Chariton, Iowa, of which A. J. Adams is manager, is nearing the completion of the laying of over 15,000 feet of underground cable. The size of this cable varies from 500-pair to 50-pair and is all jute-covered. The completion of this job will place the greater portion of the Chariton exchange underground, states Mr. Adams.

Five-Cent Charge For Fire Calls

Based on the theory that a public service should be as efficient as possible, particularly during an emergency, the Pike County Telephone Co., Pittsfield, Ill., will make a five-cent charge for information regarding a fire. Calls following a fire alarm swamp the switchboard and as a result other services are temporarily suspended. To correct this situation the five-cent charge is to be made.

Money so collected goes to the fire department, which is a party to the arrangement with the telephone company. The company, when there is a fire, will use the time ordinarily spent in answering curiosity calls in calling each of the firemen and in notifying the owners of the property affected by the fire and also those owning property adjacent to the fire.

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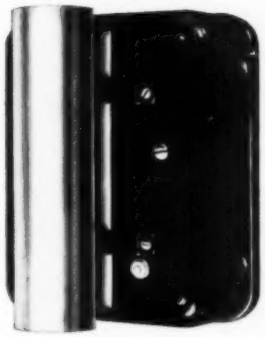

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NEWS of the Industry

National Association Names Separation Committee

President Carl D. Brorein of the United States Independent Telephone Association has appointed a committee on separation of intrastate and interstate telephone property to represent the association in studies being made by regulatory commissions.

The following were appointed as members of the committee: R. A. Phillips, Sioux City, Iowa, chairman; C. E. Archer, Tampa, Fla.; E. M. Blakeslee, Madison, Wis.; Ranford Dunlap, Fort Wayne, Ind., and H. H. Wheeler, Lincoln, Neb.

Association, Manufacturers Attend Priorities Meeting

The United States Independent Telephone Association was represented at a priorities meeting held by the OPM for trade association executives and manufacturers in Washington on August 1 by Executive Vice President Louis Pitcher and Washington Representative Clyde S. Bailey.

Priorities Director Edward R. Stettinius, Jr., and other representatives of the OPM conducted the all-day meeting at which they explained the need for conserving critical materials and also told of plans to administer the rationing of those materials by OPM and OPACS. Plans were made to accommodate about 125 trade association executives and manufacturers, however, it is reported that 500 attended the meeting, clearly indicating the importance of and interest in priorities on the part of industry.

Also attending the meeting were G. B. Foscue, Chicago, vice president, Automatic Electric Company and R. M. Tredwell, Chicago, assistant purchasing agent, Kellogg Switchboard & Supply Co.

Southwestern Bell Announces Changes

The election of George C. Gephart as vice president in charge of personnel relations and of E. W. Meyer as secretary-treasurer of the Southwestern Bell Telephone Co. was recently announced by A. C. Stannard, president of the company, following a meeting of the board of directors. Mr. Meyer will be succeeded as general auditor by M. W. Cummings, general statistician.

Col. H. D. McBride's resignation, to become director of public safety for the city of St. Louis, left vacant the position of secretary which he has held since 1931. Mr. Gephart has been treasurer since 1933 in addition to his duties as assistant to president in charge of personnel relations. As vice president, he will devote full time to the latter duties.

Mr. Gephart started with the telephone company in 1920 as executive assistant and the following year became general commercial supervisor.

Something of a milestone was passed July 8, at the Baer Field Army air base, Fort Wayne, Ind., when Ward Hinesley, an employe of The Home Telephone & Telegraph Co., installed the company's 40,000th telephone in the Fort Wayne area in the post surgeon's office at the air base. The picture above shows the installation being made at the desk of CAPT. PAUL H. JENKINS, post surgeon, who is seated. Standing are LT. LYLE A. LACROIX, assistant signal officer at the field, and C. E. McCORMICK, commercial supervisor of the Home T. & T. Co. who is pointing out to the Army men the special service numbers listed in the telephone directory. WARD HINESLEY, installer for the telephone company, is completing the installation of the service (lower right).

E. W. MEYER

G. C. GEPHART

M. W. CUMMINGS

H. D. McBRIDE

He later was manager of the securities department and assistant treasurer before being placed in charge of the personnel relations department in 1927.

Mr. Meyer's telephone experience dates from 1906 when he became a bookkeeper for the telephone company in St. Louis. He advanced through various positions in the accounting department to become chief accountant in 1922. The following year he went to New York as accountant for the American Telephone & Telegraph Co. He returned to St. Louis in 1926 as general auditor.

Mr. Cummings started with the telephone company in 1912 as a clerk in St. Louis. After holding various positions in the accounting department, he was appointed statistician in 1926, and in 1939 became general statistician.

In 1894, Colonel McBride entered the telephone business as a switchboard installer and repair man in Cleveland. In 1902, he joined the staff of the A. T. & T. in Boston, and in 1909 went to Dallas as general traffic superintendent. He went to St. Louis as engineer in 1913, and in 1917 became secretary of the employes' benefit committee. During the war he served at Camp Zachary Taylor and with the A. E. F. in France.

▼ ▼

Pitcher and Gay on Civilian Defense Board

Louis Pitcher, Chicago, executive vice president, United States Independent Telephone Association and F. S. Gay, New York, American Telephone & Telegraph Co., have been appointed to represent the telephone industry on the communications liaison committee of the Office of Civilian Defense by Mayor F. H. LaGuardia of New York, director of civilian defense.

The duties of this committee are to submit expert advice on problems of joint concern to the Defense Communications Board and the Office of Civilian Defense. Also it is to recommend plans for the most efficacious use in the general plans for civilian defense of all necessary communication facilities.

Company "Gets Acquainted" With Men in Service

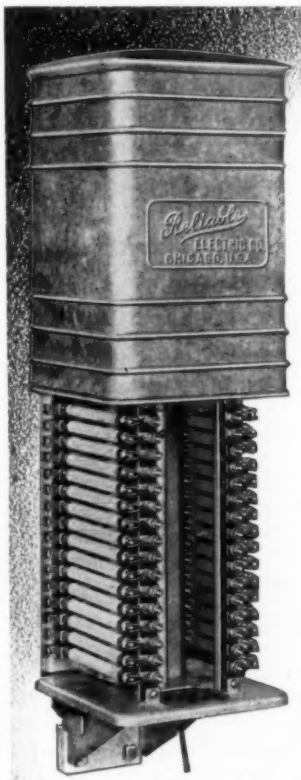
To aid in keeping up the morale of its employes in the armed forces and to welcome men from other telephone companies encamped in its territory, the Southern Bell Telephone & Telegraph Co. is endeavoring to make contact with each telephone employe encamped in the South.

Each of the approximately 300 officers and men from other telephone companies who are stationed in Southern Bell territory has been sent a letter of welcome by the company. "It gives us pleasure to have learned that you are encamped within the territory of our company," states the letter, "and we send you our greetings and the hope that your stay in the South will be pleasant to you, and profitable to the national defense."

After touching on some of the problems faced by the company in furnishing telephone service to the many camps and stations in its territory, the letter concludes: "Whenever you are in range of one of our offices, we hope that you will call on our local representatives and give us the pleasure of coming to know you. Whenever we can serve you, please consider us at your command."

To help telephone men from different companies get acquainted with one another, the Southern Bell has mailed to each man a list of Bell System employes in all the camps and stations in its territory. In addition, it has distributed similar lists of its own employes.

As of April, 1941, there were 208 Southern Bell officers and men in the armed forces and 271 from other Bell System companies serving in southern camps and stations, the company has reported. Of the 208 Southern Bell employes, 38 per cent are commissioned officers, it was said.



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XUM

Transcontinental Cable One-Fourth Completed

Nearly 500 miles of the new buried transcontinental twin cable have now been laid. Cable laying trains of the American Telephone & Telegraph Co.'s long lines department, averaging 40 miles a month, have completed a quarter of the distance between Omaha, Neb., and Sacramento, Calif.

In order to meet the needs of national defense and mounting business requirements, plans have been worked out so that the "plowing in" of this cable could be carried on 24 hours a day if necessary. This is made possible by equipping the tractor trains with floodlights which enable them to work at night.

For the most part, the cables are buried with a coverage of earth of about 30 inches, except where variations in the soil or character of the route made it necessary or desirable to vary this depth.

Gas pressure is maintained inside the new type cables while they are being laid. The gas pressure is measured after the cable has been placed to make sure that no sheath opening has occurred during the plowing-in operations.

After the cable has been plowed in, other gangs follow along to splice the wires together at the ends of the cable lengths. The cable is for the most part manufactured in 3000-foot lengths so that in general splices will be required at 3000-foot intervals.

To date the long lines department has completed about 30 repeater station buildings between Omaha and Laramie and Denver and Cheyenne. Most of these buildings are one-story, concrete and brick, 20 feet by 40 feet in size.

No construction has been started on the section of the cable west of Laramie but plans call for building over 25 more repeater stations to Wendover, Utah, and counting those to be built by Pacific Telephone & Telegraph Co. there should be from 90 to 100 buildings in all when the job is completed.

The new cable will supplement several existing "open wire" transcontinental lines, and, according to present plans, from 50 to 70 telephone circuits will be put in service over the completed sections between Laramie and Omaha, by some time in December.

When the rest of the cable is completed in December of 1942, there will be about 100 circuits in the cable all the way from Omaha to Sacramento, plus about 20 or more to take care of traffic between the East and Denver. Eventually the long lines department expects to have some 600 telephone channels working through the cable, or about triple the present number of transcontinental circuits.

IDEALIZE THE REAL

By Miss Anne Barnes
Traveling Chief Operator, Iowa Independent Telephone Association

THERE is an old saying to this effect: "We should cut our cloth according to our pattern." That means we must have cloth enough for the pattern to fit on properly, and the kind of a pattern suitable for the cloth we have. And we must follow the instructions on the pattern closely. This is all easier said than done, of course, as anyone knows who has tried to use a pattern. And if the cloth is from an old garment which is to be made over into another one, the pattern must be suitable for that cloth.

The center of every man's existence is said to be a dream or mental word painting of an ideal. Who of us has not some particular dream or ideal? It may be too large to fit on and cut from our cloth of opportunity. This may be one reason why many of us fail to reach our ideals and goals, but just trying hard and long enough will take us nearer toward attainment than only thinking and yearning will do.

A group of operators were discussing this subject one afternoon in the restroom. It was interesting to listen to these young girls talk. They all wanted to accomplish something worth while and outstanding. Some would have to receive help and guidance from their parents, while others without a family had to depend on themselves entirely. Nearly all of them wanted to marry at some future time.

One young girl, who seemed to have no future ahead for herself, would have to support a large family (of ne'er-do-wells, we all knew) so we hesitated to question her as to her future plans, but felt that we should include her in the discussion. And when we did she recited a quotation so beautifully that we were all silenced. It was this: "Ideals are like stars; you will not succeed in touching them with your hands, but like the seafaring man on the desert of waters, you choose them as your guides, and, following them, you reach your destiny." (Carl Schurz).

"At present, girls," she went on, "I am in a desert of waters, like the seafaring man; I am using my ideals as guides, to keep from losing myself in the meantime."

MORAL: "What we need more is not so much to realize an ideal as to idealize the real." (Hedge).

OBITUARY

SOLON WOODS, 75, a pioneer Oklahoma telephone man, died of a heart ailment at Oklahoma City on July 24. He lived at Jones, Okla., where he operated a telephone exchange for a number of years before selling.

Born in Dewitt, Ark., Mr. Woods moved to Oklahoma in 1889 and settled southeast of Oklahoma City. He served in the Spanish American war. Upon his return from the Philippines, he worked as a telephone lineman for the Mulhall Telephone Co. at Mulhall, Okla., from 1915 to 1925. He then purchased the telephone exchange at Choctaw, Okla., and from 1926 to 1935 he also operated the exchange at Jones. During that period his wife, who survives him, was the operator of the Choctaw and Jones exchanges.

FRANK NEWFORTH, JR., age 59, engineer of the Southern California Telephone Co., Los Angeles, Calif., died June 21 after a brief illness of one week. Mr. Newforth was a native of Cincinnati, Ohio. He was shop superintendent for the Home Telephone Co. of Los Angeles from 1903 to 1910 and was with the Automatic Electric Co., Chicago, for four years from 1910 to 1915.

Mr. Newforth was associated with the Automatic Telephone Manufacturing Co., Liverpool, during the year 1913. Following two years of rest near Clermontville, Ohio, he was employed with the Dalton Adding Machine Co. at Cincinnati from 1917 to 1921. He returned to the Pacific Coast in 1921. A circuit engineer, Mr. Newforth designed many of the improvements now in use in the step-by-step dial telephone system.

With the Manufacturers

Uses of Company's Products Shown in Cope Display

An attractive and unusual display model, showing the uses of many of the products of T. J. Cope, Inc., 6120-22 Vine St., Philadelphia, Pa., made its first public appearance at the Niagara Hudson Safety Meeting on June 25 in Buffalo, N. Y. The display will be shown throughout the country, accord-

ing to Advertising Manager Stuart Sommer.

In addition to showing many actual Cope products, the exhibit features a scale model layout of a typical underground duct system. The model illustrates how most of the tools and equipment manufactured by the company are brought into play in various manhole and other underground operations. Examples of actual Cope products—including cable racks, conduit rods, and other underground conduit tools and equipment—are displayed below the scale model.

The entire display is mounted on an attractive and attention-getting panel. Mr. Sommer reports that the exhibit has already received much favorable comment from the field.

New Emergency Lighting Unit by Carpenter

Designed for operating rooms, control rooms and other important points in telephone exchanges and industrial plants, a new automatic emergency lamp unit operated by a storage battery has been developed by the Carpenter Manufacturing Co., Cambridge, Mass.

The Type DUL Masterlight, as the new unit is called, consists of two light heads, an automatic switchover relay and a self-contained battery. The components are housed as a single unit. One head is a floodlight, illuminating an area of 10,000 square feet, while the other projects a 250,000 candlepower beam for distances of from a few feet to a mile as required. The DUL may also be had with both heads either beam or flood.

The automatic switchover relay turns on the emergency illumination instantly, after a failure of the 110-120 volt outside current supply. The unit also has manual control. The battery is of 100 ampere-hour capacity, and will hold its charge for a full year. It may be charged as required with an ordinary battery charger.

The DUL Masterlight, the Carpenter company states, will supply adequate emergency lighting for a room of reasonable size for a full night before the battery requires recharging, and for a small area much longer. It comes ready to mount, with a cord and plug to connect the automatic relay into the 110-120 volt line.

Weighing 42 pounds, the complete unit is 18 inches high, 15 inches wide overall, and has a 7¾-inch square base. One or two additional light

Hemingrays Will Outlive Your Poles, Crossarms, etc.

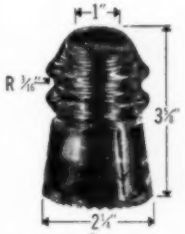
PROOF of it is furnished by a well-known utility (name on request) who report that *today they are using thousands of Hemingrays purchased 50 years ago!*

REASON for it lies in secret Hemingray glass "batch-mix" and Owens-Illinois production-control that results in insulators free of voids, strains and stresses . . . so homogeneous that they are unimpaired by sudden temperature changes . . . impervious to moisture-penetration from all sources.

COST? Low to begin, *lower* in service-life. Hemingrays are sold *only* by principal jobbers.

11 Hemingrays Cover All Line Needs

Favorite for rural-line operation is Hemingray Number 9, with drip point petticoat for fast moisture run-off. Number 16 with its double groove. Number 42 with long leakage path giving trouble-free "toll" service. Ask for samples.



OWENS-ILLINOIS

HEMINGRAY Telephone & Telegraph Insulators · LOWEX Power Insulators

Export Agents: International Standard Electric Corp., New York

XUM

Operated by a storage battery, this compact emergency unit will furnish light for an operating room or other vital point during an entire night when the outside power supply fails.

heads can be attached to the DUL Masterlight, the company points out. These come with wall mounting brackets and 15-foot cords, ready to plug into sockets installed in the case of the main unit.

The new unit is finished in a manner resembling chrome plate, and is of excellent construction throughout, it is said. The DUL is stated to be thoroughly reliable in operation, and is recommended for use in locations where light must be maintained regardless of conditions.

▼ ▼

Deducts Defense Bond Payments from Pay Rolls

Kellogg Switchboard & Supply Co. has arranged with its employes to make deductions from pay checks, in such amount as the employes may designate, for the purchase of United States defense savings bonds.

In order to assist employes in making this worth-while investment, the company will contribute out of its own funds $1 to each employe who buys a defense savings bond.

▼ ▼

Philco Adds to Storage Battery Plant

The storage battery division of Philco Corp. is beginning operations this month in a recently acquired plant at Trenton, N. J., where its productive capacity will be three times as great as formerly, it has been announced by M. W. Heinritz, general manager of the division.

"Establishment of this special plant in Trenton is evidence of the extent to which Philco's operations are continuing to grow," Mr. Heinritz pointed out. "This is true both of the company's peacetime business and also of the part it is playing in the national defense program."

The Philco battery plant is devoted entirely to the manufacture of industrial batteries, according to Mr. Heinritz. The building is of brick, steel, and glass with sawtooth and monitor roof construction. Seven hundred feet in length, the plant is so arranged that all operations are carried out on a single level. The plant layout for routing of materials permits a continuous flow from the raw materials at one end to the finished product at the other.

A complete chemical, physical and electrical laboratory is an integral part of the plant, so that research and development in the field of storage battery manufacture may be carried on continuously.

It is estimated that the new Philco battery plant will have an output totaling about 10,000,000 ampere hours per month. Batteries being turned out range in size from 10 ampere hour capacity to 7,000 ampere hour capacity for each single cell and weigh anywhere from 6 pounds to over one ton per cell.

Among the most important uses for which Philco is now producing storage batteries are: electric industrial trucks, telephone central offices and PBX, mine locomotive service, industrial locomotives, generating station standby, diesel starting, emergency marine service, railway air conditioning, railway signal and general industrial heavy duty service. In addition, the company is supplying storage batteries to the United States Navy.

Associated with Mr. Heinritz in the management of the storage battery division will be Harvey N. Stover, engineering manager, and Phil S. Harvey, sales manager.

▼ ▼

Jack Haley Scores Hole-in-One

The thrill of a lifetime came to J. B. (Jack) Haley, sales engineer of the Automatic Electric Company, Bellevue, Ohio, when he scored a hole-in-one on the tricky 16th hole at Plum Brook Country Club recently while playing in a threesome of Bellevue golfers.

Mr. Haley, a lefthander, achieved his first ace and the first one scored on the Plum Brook course in two years.

▼ ▼

New Treasurer, Vice President of Copperweld

Copperweld Steel Co. has announced the election of Thomas F. Troxell as treasurer and a director. Mr. Troxell has been a partner of the investment banking firm of Riter & Co., New York.

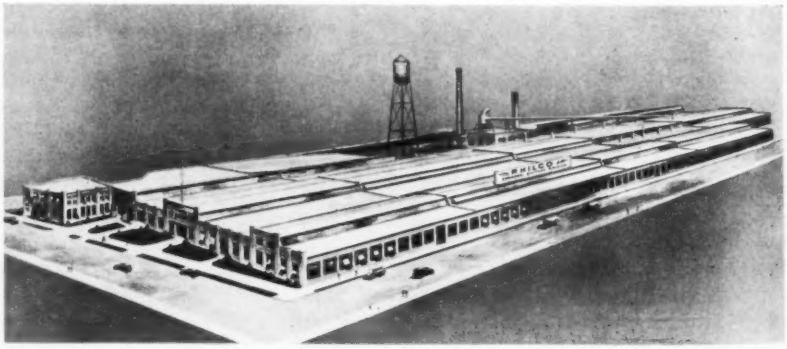
C. Walter Holmquist, formerly general superintendent, has been made vice president in charge of plant operations, Glassport division.

▼ ▼

Weston Issues New Testing Bulletins

The Weston Electrical Instrument Corp., of Newark, N. J., has released to the telephone field several bulletins describing its testing equipment, among which are booklets on panel instruments, multi-purpose test instruments, and ideas for profitable servicing.

These bulletins may be obtained by writing directly to the Weston company.



Trenton (N. J.) plant of storage battery division of Philco Corp. Productive capacity in this new plant has been tripled, says the company.

Commissions and Courts

Nebraska Exchange to Get Increased Rates

Over the protests of some of the subscribers, authority has been granted by the Nebraska State Railway Commission to the Nebraska Continental Telephone Co. to increase rates at its Battle Creek exchange. While the increase is not as large as was asked for, the commission said the evidence is conclusive that the business rates now being charged are less than in a group of towns of like population, the residence rates are below the average, and the rural rates are as low or lower.

The commission felt impelled to take into account in fixing the new rate schedule the fact that a rate so high as to result in a considerable number of discontinuances lessens the value of the service to the remaining subcribers.

Heretofore only grounded service has been given. The exchange was rebuilt recently and only metallic service was offered. The commission estimated the proposed rates would produce a return of 5.6 per cent on an investment of $45,711, which is reasonable, although on a comparative basis the rates may appear "somewhat high." Account is taken also of the fact that the company has received in the past a meager return for the entire company operations.

The rates as authorized are substantially higher than those charged for grounded service in the past. Net rates for one-party business were $1.50 for wall or desk service and $2.00 for handsets. These are increased to $3.25 and $3.50, respectively, with extensions also slightly increased. One-party residence, wall or desk, is increased from $1.50 and $1.75 to $2 and $2.25 for handsets; four-party residence, wall or desk, is increased from $1 and $1.25, respectively, to $1.75 and $2.00. Ten-party rural business, now $2.00, is increased to $2.50, while ten-party residence is increased from $1.25 for wall and $1.50 for desk to $1.75 for wall or desk, while handset service is offered at $2.00.

The new schedule becomes effective for 24-hour service when the applicant is prepared to furnish all metallic lines.

▼ ▼

Commission Secretary Recommends Rate Revisions

The secretary of the Ohio Public Utilities Commission on July 29 filed a report with that body and certified approval to the Ohio Associated Telephone Co. and public officials on the application of the company to revise rates in the Scott, North Star and Yorkshire exchanges.

The Scott exchange rate increase would be as follows: Business inde-

Answers to Traffic Questions on Page 22

1. The letter "P" is entered in the "Class" space.
2. "Room telephone DA" is not a chargeable report unless the called party is paged.
3. If the calling party cancels the call after the operator reports that she is ready on the call, WH constitutes a chargeable report.
4. No. The calling party's name should be entered only in cases where this information is required such as on messenger, appointment, collect calls, etc. However, if it is the policy of your company to enter this information on all person-to-person calls, you will, of course, follow the practice of your company.
5. The Springfield operator should tell the calling party that Mr. Brown can be reached at the Leland Hotel in Springfield. Ordinarily the calling party will be on the line and will hear the report received from the called station.

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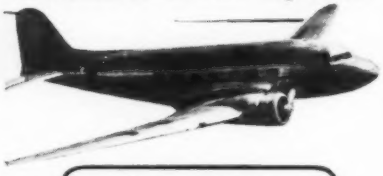

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pendent, $1.75 to $2.50; business two-party, new, $2.00; business rural, $1.75 to $2.00. Residence independent, $1.25 to $2.00; residence four-party, $1.00 to $1.50; residence rural, $1.25 to $2.00.

Using a rate base of $14,714 in this exchange, there would be an earning equivalent to 2.71 per cent under existing rates and a profit of 1.52 per cent under the proposed rates.

The proposed rate changes for the North Star exchange are: Business independent, $1.25 to $2.50; business two-party, new, $2.00; business four-party, $1.00, to be discontinued; business rural, $1.00 to $2.00; residence independent, $1.25 to $2.00; residence four-party, $1.00 to $1.50; residence rural, $1.00 to $1.25.

Using a rate base of $15,397 for the North Star exchange, in the present rates the earning is equivalent to a deficit of 6.60 per cent, and under the proposed rates this would be reduced to a deficit of 3.62 per cent.

The proposed increased rates for the Yorkshire exchange are as follows: Business independent, $2.00 to $2.50; business two-party new, $2.00; business rural, $2.00, no change; residence independent, $1.00 to $2.00; residence four-party, new, $1.50; residence rural, $1.00 to $1.25.

Using a rate base of $18,577 for the Yorkshire exchange the report sets up a deficit equivalent to 3.38 per cent under the present rates and estimates that this would be reduced to .89 per cent under the proposed rates.

▼ ▼

Reopens Case Involving Toll Line Connections

Upon presentation of a statement by E. D. Simpkins that he had discovered new evidence in connection with his application for toll connections with the Southwestern Bell Telephone Co., at Guthrie, Okla., the Oklahoma Corporation Commission re-opened his case for further hearing July 29 after having denied his application on June 27 (TELEPHONY, July 12, p. 27).

Mr. Simpkins had put in a telephone switchboard at a Guthrie oil field community called Rusty, had built a toll line from that point to the environs of Guthrie, but the Southwestern Bell Telephone Co. had refused to give his line connection with its toll system at Guthrie.

The commission, in its order of June 27, sustained the contention of the Southwestern Bell company that the territory about Guthrie and Rusty was already adequately served by direct lines of the Bell interests and by farmers' cooperative lines connected to Bell lines.

As alleged new evidence, Mr. Simpkins placed on the stand Billy Hogan, of the Pleasant Valley (Okla.) telephone exchange, and Guy Hall, who has operated telephone exchanges at various points in Oklahoma, to testify at the re-opened hearing on July 29 that in their opinion the Guthrie oil field was open territory before Mr. Simpkins brought his exchange and toll line into the area.

They reviewed telephone conditions in the field prior to the time of Mr. Simpkins entrance, in an effort to support their claims. The commission took the re-opened case under advisement.

▼ ▼

Summary of Commission Hearings and Rulings

Federal Communications Commission

August 18: Hearing on joint application of Carolina Telephone & Telegraph Co. and M. R. Montague, doing business as Colerain Telephone Co., for a certificate that the proposed acquisition by the Carolina company of the plant and property of the Colerain company will be of advantage to persons to whom service is to be rendered.

Alabama Public Service Commission

July 19: Approved sale of the property and assets of the Springville Telephone Co. by L. M. McDonald to W. Fred Jones.

California Railroad Commission

July 31: Authority granted the California Water & Telephone Co. to issue and sell at 106½ per cent of the face value and accrued interest, $5,850,000 of first mortgage bonds, 3.6 per cent series due 1971, to redeem $5,650,000 of first mortgage bonds 4 per cent series due 1969, to pay expenses incident to issue of bonds, and to reimburse treasury because of expenditures for additions and betterments to properties; authorized to amortize bond discount, expenses and premiums.

Illinois Commerce Commission

September 24: Hearing on proposed telephone rate cut between the Lawndale-Crawford and Berwyn areas of the Illinois Bell Telephone Co.

Minnesota Railroad & Warehouse Commission

September 5: Hearing on application by Northwestern Bell Telephone Co. for approval of a change of rates at Grand Rapids.

Nebraska State Railway Commission

September 25: Hearing on application of the Bertrand Telephone Co. for validation of an issue of $3,000 of notes.

New York Public Service Commission

August 7: Hearing at New York in proceeding on motion of the commission as to certain rules and regulations of New York Telephone Co. in respect to service through private branch exchanges in hotels, apartment houses, and clubs.

Ohio Public Utilities Commission

July 29: Ohio Associated Telephone Co. seeks authority to revise its rates in the Scott, North Star, and Yorkshire exchanges.

July 29: Authority granted the Webster Telephone Co. to file the following tariff for full automatic service, which by agreement with the subscribers is being installed in its Lucky exchange: Business independent line, $4.85; business two-party line, $4.35; business rural, $3.60; residence independent, $3.10; residence five-party, $2.25; residence rural, $2.25.

July 30: Permission granted the College Corner Telephone Co. to increase rates (effective August 1) as follows: Business independent line from $2.25 to $4.00; business five-party line, new, $3.50; business rural, $1.66 to $2.25; residence independent, $1.66 to $2.50; residence two-party, $1.25, to be discontinued; residence five-party, new, $2.00; residence rural, $1.66 to $1.75.

July 30: Kenton Telephone Co. requested to show cause why it should not be prohibited from further declaring and paying dividends upon its issued and outstanding common stock, until otherwise ordered by the commission. The Kenton company has been accused of paying such dividends when its earned surplus account does not carry a sufficient credit to permit such payments.

July 31: Application of the Ohio Associated Telephone Co. to discontinue use of private PBX at the Christman Hotel, Bryan, was set for hearing September 4.

August 2: To insure adequate telephone service to the Toledo airport, the following applications will be effective November 1 when the new Moline plant will be placed in service:

The Lemoyne Telephone Co. will file the following tariff for automatic service in a new Moline exchange to be created out of part of the Lemoyne exchange and part of the Toledo (Bell) exchange: Business independent line, $11.85; business rural, $4.85; residence independent, $4.85; residence five-party, $3.60, and residence rural, $3.10.

Authority granted the Ohio Bell Telephone Co. to revise its Toledo exchange tariff to show free service to the Moline exchange, to transfer certain territory by each to the other, and to approve boundaries of the Toledo and new Moline exchanges.

August 15: Hearing on petition of Oil Belt Telephone Co. to abandon its exchange at Rudolph and to hereafter furnish the 82 subscribers now served there with rural service from the Portage exchange.

Oklahoma Corporation Commission

July 29: Application of E. D. Simpkins for toll connections at Guthrie with the Southwestern Bell Telephone Co. re-opened for introduction of alleged new evidence. Hearing held on that date and case taken under advisement.

July 31: Application of the Oklahoma Rural Telephone Co. of Enid, for connections at Drummond with the Southwestern Bell Telephone Co. toll lines finally heard and closed. Decision reserved for future order.

Wisconsin Public Service Commission

July 25: Floyd H. Lean, Walworth county, granted authority to be properly classified as a business subscriber of the State Long Distance Telephone Co. and not as a residential subscriber.

August 15: Hearing in Madison to investigate the proposal of Commonwealth Telephone Co. to eliminate certain free toll service at its Barneveld, Iowa county, exchange.

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BUCKEYE TELEPHONE and SUPPLY COMPANY
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Mid-West States Company Holds Picnic

(Concluded from page 16)

handled the arrangements for the outing.

This is the first Jester picnic attended by TELEPHONY'S managing editor who thoroughly enjoyed himself and is already anticipating next year's party.

▼ ▼

New Company Formed

The property of the Farmers & Merchants Telephone Co., Lovington, Ill., which was bought by H. C. Vernon of Chicago at a bankruptcy sale, will be operated by a new corporation known as the Moutrie County Telephone Co. Mr. Vernon is president of the new company and J. D. Hines will be retained as manager. Mr. Vernon says he intends to rebuild the property throughout and will begin by renovating and remodeling the present office building.

▼ ▼

Direct New York-Panama Circuit

A new and improved communications link between the United States and Panama and the Canal Zone was established with the opening of a radiotelephone system between New York and Panama City on July 11. This system provides one circuit initially, with facilities for a second as soon as it is needed. Calls between the United States and Panama have more than doubled during the yast year.

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Loomis Advertising Co.	33
Lorain Products Corporation	—
McCabe-Powers Auto Body Co.	—
MacGillis & Gibbs Co.	33
Matthews Corp., W. N.	—
Michigan Pole & Tie Co.	33
National Carbon Co., Inc.	—
National Construction & Engineering Co.	—
National Fireproofing Corp.	—
National Lead Co.	—
National Telephone Supply Co.	6 and Back Cover
Naugle Pole & Tie Corp.	—
Neale Mfg. Co.	—
North Electric Mfg. Co.	35
Owens-Illinois Glass Co., Hemingray Division	29
Paragon Electric Co.	—
Partridge Lumber Co.	33
Peatrophone Corporation	—
Philco (Battery Division)	8
Phillips Electric Works, Inc.	—
Porcelain Products, Inc.	—
Postal Telegraph Co.	32
Premax Sales Division, Chisholm Ryder Co., Inc.	—
Raytheon Mfg. Co.	7
Ray-O-Vac Company	32
Rebuilt Electric Equipment Co.	34
Reliable Electric Co.	27
Remington Rand, Inc.	—
Rhodes & Sons Co., M. M.	—
Roebling's Sons Co., John A.	—
Schauer Machine Co.	—
Seyler Mfg. Co.	—
Seymour Smith & Sons, Inc.	—
Sherron Metallic Corp.	—
Sloan & Cook	33
Stephens Co., E. W.	34
Stewart Brothers	34
Stromberg-Carlson Telephone Mfg. Co.	3
Sturgis Posture Chair Co.	—
Suttle Equipment Co.	—
Talbot, Emmett D.	33
Taylor-Colquitt Co.	—
Telephone Repair Co.	—
Tele-Tile Co., The	—
Telkor, Inc.	2
Union Carbide & Carbon Corp.	—
United States Steel Corp.	—
Valentine Clark Corporation	33
Wagner-Malleable Products Co.	—
Western Electric Co.	—
Weston Electrical Instrument Corp.	—
Westwood Press, The	—
Whitney Blake Co.	—
Wood Preserving Corp., The, a Koppers subsidiary	—
Wopat, J. W.	33
Wray & Co., J. G.	33

NORTH

"All-Relay"

EQUIPMENT

HAS PROVED ITS WORTH FOR

25

Years

THE NORTH ELECTRIC MFG. CO.

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NATIONAL CABLE RINGS

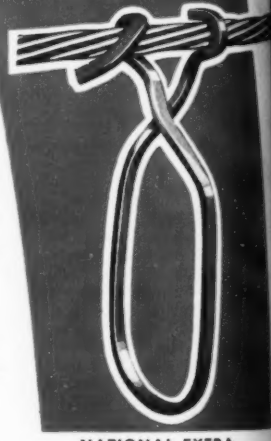
Assure A Long-Lasting, Low Cost Installation

. . . That Can Be Made In Minimum Time . . .

Note how easily National Rings are placed on the Messenger Strand

NATIONAL REGULAR RING

THE "HANDY FIVE" CLUSTER



NATIONAL EXTRA LONG RING

IN FACT, with the use of National Rings you simplify and speed up the whole job of cable hanging anywhere, even in obstructed, congested areas or in rough country districts where lines do not follow the highway.

The special design of National Rings assures quick, easy placing of rings and the "Tension Grip" holds them firmly in position. They will not slip along or jump off the messenger strand so there's no need of re-riding the messenger to respace or replace rings. Cable can be pulled from either direction and old cable pulled out and new installed without re-ringing.

Another big time and money-saving advantage secured with National Rings is that with the Extra Long Rings an additional cable can be hung on the existing strand where extra service is necessary. Thus the cost of the installation of an entire new messenger strand is eliminated.

All National Rings are gathered in a very clever way, in "Handy Five" Clusters, which assure utmost convenience in handling, eliminate all hooking together of rings in package or lineman's pail, and do away with unsightly ground litter.

Standard Rings are Hot-Dip Galvanized but they can also be furnished in Copperweld and Calsun Bronze.

Order "National's" from your jobber today.

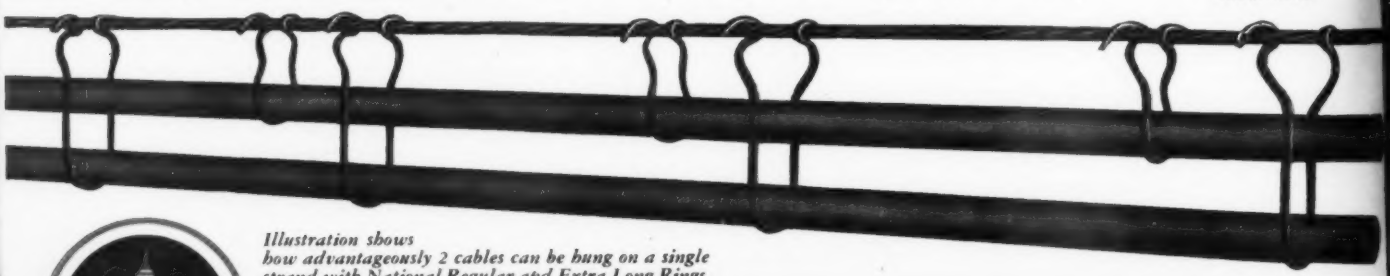


Illustration shows how advantageously 2 cables can be hung on a single strand with National Regular and Extra Long Rings.

THE NATIONAL TELEPHONE SUPPLY COMPANY

5100 SUPERIOR AVENUE • • CLEVELAND, OHIO

Canadian Mfr.—N. SLATER CO., LTD., HAMILTON, ONT., CANADA

Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

. . . RING with "NATIONALS"—The Ring With the Tension Grip